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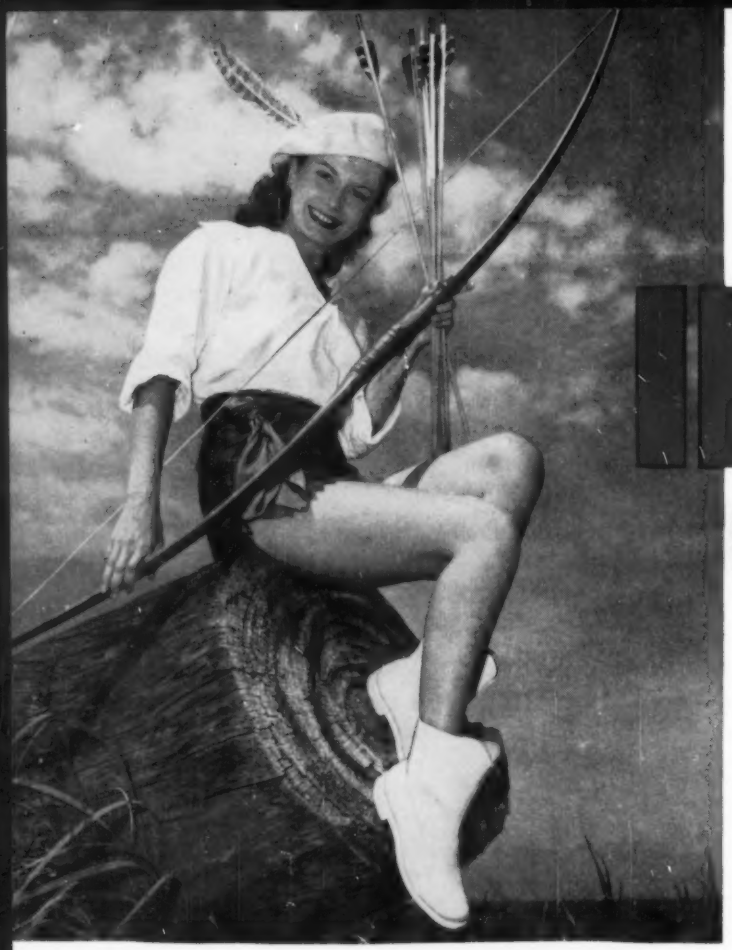

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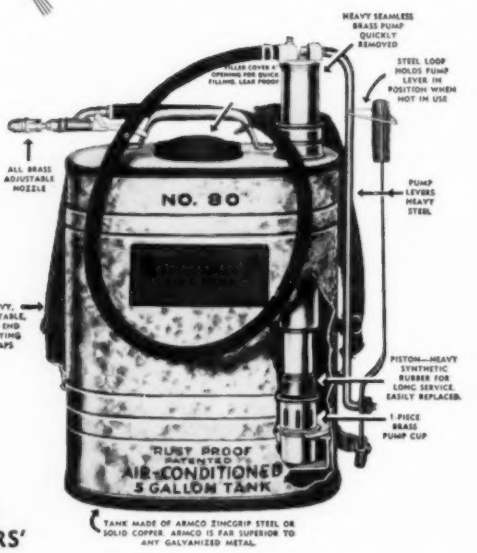
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Journal of Forestry

Official Organ of the Society of American Foresters

The American Forestry Association's First Eighty Years

Samuel T. Dana

Dean emeritus,
School of Natural Resources,
University of Michigan, Ann Arbor

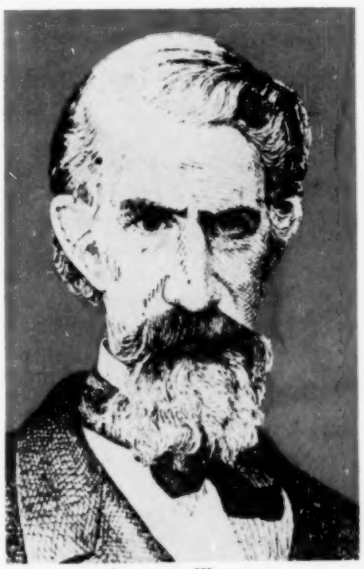
In September, 1955, The American Forestry Association was 80 years old. It is therefore the oldest group in North America organized to promote forest conservation. Its record of leadership, beginning when it was unique in the field of citizens' organizations and continuing to the present when there are many groups of both general and special interests, parallels the history of American forestry. In recognition of the untiring efforts and substantial achievements of A.F.A. in the promotion of forest policy and practice, we requested Dean Dana to contribute the following history of its activities to our professional literature.

EIGHTY years ago there was not a single forester in the United States and not a single acre of land was under forest management. Today there are more than 16,000 men with professional training in forestry, which is effectively practiced on millions of acres by both public and private agencies. The part which The American Forestry Association has played in bringing about this revolution is too little appreciated either by the general public or by foresters. Perhaps its recent birthday affords a good opportunity to look at the record.

Organization and Early Activities

The birth of the Association on September 10, 1875, was announced thus by the *Chicago Tribune:* "A number of gentlemen interested in forest-culture assembled in the ladies' ordinary at the Grand Pacific yesterday morning at 8 o'clock, for the purpose of organizing a Forestry Association." Leadership in bringing the group together was taken by John A. Warder, an Ohio physician, pomologist, landscape gardener, and amateur forester, who became its first president. In his call for the meeting he stated as one of the objectives of the proposed association, "The fostering of all interests of forest planting and conservation on this continent." Dr. Warder was thus talking about "conservation" some thirty years before the word was popularized by Gifford Pinchot and Theodore Roosevelt.

At the second meeting of the Association in 1876 arrangements were made to absorb the American Forestry Council, a committee of the Farmers' Club of the American Institute in New York City which had been appointed in October, 1873, with ambitious plans for the promotion of forestry through the organization of an independent society which never materialized. During the next few years the activities of The American Forestry Association were chiefly those of its president, who continued to be Dr. Warder. At its last formal meeting on June 29, 1882, a committee was appointed to pave the way for amalgamation of the Association with the American Forestry Congress which had been organized a couple of months earlier.



JOHN A. WARDER

The first American Forestry Congress, held at Cincinnati from April 25 to 29, 1882, gave forests and forestry the greatest publicity they had yet received in the United States. The most spectacular feature of the Congress was the celebration of Arbor Day by "the first public planting of memorial groves in America, if not in the world, in honor of statesmen, authors, soldiers, and distinguished citizens." Those present decided that the Congress should perpetuate itself as a permanent organization and arranged to hold the next meeting at Montreal in August, 1882, when the consolidation of the two organizations was effected with a total membership of 266 persons.

The eighth annual meeting at Atlanta in December, 1888, was featured by the absorption of the Southern Forestry Congress. The next year (1889) the constitution was amended to read: "This Association shall be known as the American Forestry Association, and its annual meetings shall be called Forest Congress." Some thirty-five years later, in 1923, the Associa-

tion absorbed the National Conservation Association, which had been formed in 1909. The present Association (commonly referred to hereafter as A.F.A.) is thus the result of the amalgamation of five once independent organizations—the original American Forestry Association, the American Forestry Council, the American Forestry Congress, the first Southern Forestry Congress, and the National Conservation Association.

Following the enthusiasm generated by the Cincinnati and Montreal meetings in 1882, membership in the American Forestry Congress declined. The early lack of members and money, however, did not dampen the zeal or weaken the persistence of the relatively few devoted men who formed the backbone of the organization and who from the beginning made it a force to be reckoned with. Their interests included every aspect of forestry — technical, economic, and political—with emphasis on education and legislation as the primary means of establishing constructive forest policies and sound forest practices. The Executive Committee summed up its attitude thus: "This Association has two immediate objects in view by means of which ultimately to secure forest preservation — education, leading the public mind to see the necessities of the situation; anl legislation, establishing proper methods of dealing with the situation. It would be almost as fatal to abandon the fight on the second line as on the first."

At the annual meeting in 1885 President Warren Higley sounded the keynote of the organization's activities for many years when he urged that government forest lands be withdrawn from sale and entry, and that efficient measures be taken to protect them from fire and trespass. The next year the Congress resolved: "That the public lands, at the sources of streams, necessary for the preservation of water supplies, should be granted by the general government to the several States, to be held and kept by such States in perpetuity, for the public

DON P. JOHNSTON. President of The American Forestry Association.

use, with a view to maintain and preserve a full supply of water in all rivers and streams."

The apostasy of proposing to transfer the public timberlands to the states was never repeated. The very next year the Association went on record as favoring strongly the permanent reservation by the federal government of public lands primarily valuable for timber production or watershed protection.

Campaign for Forest Reserves

At the annual meeting in 1887, Fernow presented the draft of a bill providing for the withdrawal, classification, and retention as forest reserves of such forests and timberlands as "should be permanently retained in reservation for climatic or other economic or public reasons." The bill also provided for the appointment in the Department of the Interior of a commissioner of forests who should "have the care, management and control of all the forest lands owned or controlled by the United States." The bill was endorsed by the Congress, and a special Committee on Legislation was appointed to promote its passage. From that day to this, there has been no deviation from the orthodox doctrine that federal forest lands should be retained and administered by the federal government.

Progress in obtaining action by Congress was characteristically slow but setbacks seem to have acted as a spur to greater efforts, which finally resulted in passage of the Act of March 3, 1891, authorizing the President to establish forest reserves. The victory was far from complete, however, because the act made no provision for protection and administration of the reserves. At the annual meeting in December, 1891, it was recognized that "the all-important problem is that of the management of these reservations."

During the next few years A.F.A., in spite of repeated discouragement, was indefatigable in its efforts to obtain the desired legislation. In 1894, a resolution reminiscent of A.F.A.'s current proposal for a study of forest land ownership urged the establishment of a Forestry Commission "to make a thorough investigation of the public forest lands, and to make recommendations concerning their disposition and treatment." This recommendation resulted in the famous Forest Commission appointed by the National Academy of Sciences in 1896. Fernow stated that the Executive Committee, "in securing the appointment of this body did not expect that its recommendations would be essentially or strikingly different from those made and advocated by your Association, but hopes that the weight of the opinion of the eminent gentlemen composing the forestry committee and of the body from which it was selected will do much to arouse more generally public interest and to secure the passage of desired legislation."

That legislation was finally embodied in the act of June 4, 1897, which still provides the basic principles for the establishment and administration of the national forests. Perhaps this culmination of the efforts of the Association over a ten-year period, along with other

less spectacular accomplishments, justified the self-satisfaction expressed at the annual meeting in Washington in December, 1897, by Col. William F. Fox of New York, who declared, "with great emphasis, that every development in the forestry movement in this country could finally be traced to the activity of the Association or the few who had managed its affairs." Edward A. Bowers, former Assistant Commissioner of the General Land Office, expressed the same idea at the annual meeting in 1899, when he stated that the Association had been the center to which people turned when they wished to accomplish something in forestry, and that the present reservation system was the result of its work.

Administrative Jurisdiction

The next step was to secure the consolidation in a single unit of the three agencies concerned with the administration of the reserves —the General Land Office and the Geological Survey in the Department of the Interior and the Division of Forestry in the Department of Agriculture. In 1898, the Association urged on Congress "the wisdom and economy of the unification of these varied agencies in a single Bureau adequate in resources and equipment to the great work involved." It is of interest to note that Gifford Pinchot was currently serving as chairman both of the Committee on Resolutions and the Executive Committee, which was replaced at that meeting by a Board of Directors.

Three years later, after considerable discussion, the Association became more specific as to the location of the consolidated unit, which it recommended should be "in and under the Bureau of Forestry, Department of Agriculture." The American Forest Congress which was held in Washington in January, 1905, is generally credited with having supplied the necessary pressure to bring about the passage of the act of February 1, transferring administration of the forest reserves from the Department of the Interior to the Department of Agriculture.

HENRY S. GRAVES. Pioneer professional forester who twice served as president of The American Forestry Association.

There has been no subsequent alteration of this position. In 1922, when Secretary of the Interior Albert B. Fall made no secret of his intention to annex the Forest Service, the Association resolved that it "earnestly protests against the proposal to transfer the Forest Service or any portion of it from its present jurisdiction in the Department of Agriculture." In 1931, when the question of jurisdiction had again been raised by certain implications in the report of the Committee on Conservation and Administration of the Public Domain, the Association declared itself in favor of giving the Department of Agriculture responsibility for all federal activities dealing with renewable natural resources, including forests, forage, wildlife, soil, and water.

When Secretary of the Interior Harold L. Ickes, with the apparent approval of President Roosevelt, developed ambitions to include the Forest Service in a proposed Department of Conservation, the Association participated actively in 1937 and subsequent years in the campaign to block the removal of the Service from the Department of Agriculture. In 1950 it opposed a somewhat similar proposal by a minority of the First Hoover Commission, by endorsing the recommendation by the majority that the Forest Service remain in the Department of Agriculture and that certain other land management functions now handled by the Department of the Interior be transferred to Agriculture.

Acquisition Program

Even before the transfer of jurisdiction over the forest reserves, A.F.A. joined the forces seeking legislation to permit federal purchase of forest lands. In 1899 it expressed "its gratification at the prospect of the establishment of National Parks and Forest Reservations in Minnesota and along the crest of the southern Alleghenies." Support of a liberal acquisition policy was maintained without a break at subsequent meetings of the Association. The proposal for purchases in the southern Appalachians was extended to include New England, and emphasis was shifted from parks to forests.

In 1905, the American Forest Congress adopted a strong and influential position on the subject. From then on, the effort to obtain enabling legislation became one of the chief activities of the Association. That passage of the Weeks Law of March 1, 1911, was due in large measure to the activities of The American Forestry Association cannot be doubted.

Renewed interest in the subject of acquisition was manifested at the annual meeting in 1920, when A.F.A. declared iaself "in favor of a material increase in federal, state, and municipal forests." In 1923, a bill sponsored by the Association authorized the expenditure of $100,000,000 for the acquisition of national forests, to be appropriated from year to year in accordance with the condition of the Treasury. This proposal was followed a year later by bills authorizing the appropriation of $40,000,000 over a five-year period. The final result was the McNary-Woodruff Act of April 30, 1928, authorizing the appropriation of $8,000,000 over a three-year period, of which $5,000,000 was actually appropriated.

Not satisfied with this outcome, the Association in 1930 approved a program of the National Forest Reservation Commission for the ex-

penditure of $50,000,000 over a ten-year period for acquisition purposes. Sums aggregating somewhat less than this amount were later made available by President Roosevelt out of emergency appropriations under his control. In recent years, with the marked improvement that has taken place in the management of state and private forests, the Association has laid more emphasis on maintaining the integrity of the national forests than on their expansion.

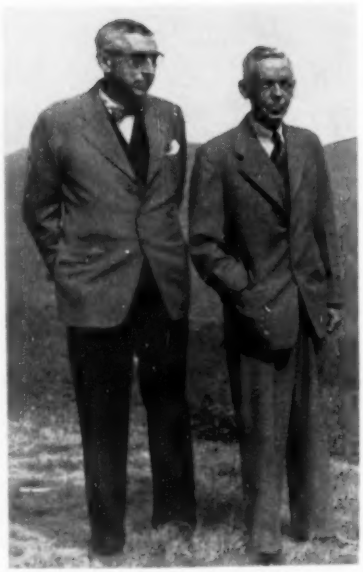
Other Federal Lands

Failure by Congress to provide for the intelligent management of the heavily timbered lands included in the revested grant to the Oregon and California Railroad Company led A.F.A. to commission its Executive Secretary, Ovid Butler, to make an on-the-ground study of the situation. His thoroughly documented article, "The Oregon Checkmate," in the April, 1936, issue of *American Forests* provided the ammunition for the campaign which resulted in the Act of August 28, 1937, placing the O. and C. lands on a sustained-yield basis.

No position has been taken by the Association on the complicated and highly controversial question as to what Department should exercise jurisdiction over the half million acres of "controverted land" in the indemnity strip of the O. and C. grant. It did, however, endorse the recommendation of the First Hoover Commission that administration of both controverted and other O. and C. lands should be assigned to a Forest and Range Service in the Department of Agriculture.

Proper management of the public range lands, as well as of the public forest lands, has long been an object of major concern to the Association. As early as 1898 it recommended "the adoption of a system for the leasing of the public grazing lands, with use of the revenue for forest preservation and irrigation development in the states concerned."

With respect to range lands included in national forests, A.F.A. in 1926 expressed itself "as emphatically opposed to the grazing legislation proposed by western stockmen or to any other legislation seeking to take from the Secretary of Agriculture authority to regulate grazing on the National Forests." A few months later the Directors spelled out this position in somewhat more detail by voting that any legislation should retain in the Secretary of Agriculture "the grant of broad administrative authority in contrast to specific grants which attempt to enumerate the details of administrative action." The next year the Association again opposed "any legislation seeking to establish by statute the legality of grazing on the National Forests."



W. B. GREELEY and OVID BUTLER. Two foresters with long service to The American Forestry Association.

In 1932 the directors recommended that the President be authorized to create grazing districts; and later in the same year the Association urged that Congress place all unreserved public lands, consisting very largely of range lands, under the Department of Agriculture, which should handle all activities dealing with agriculture, grazing, forestry, and wildlife. This position it has maintained consistently since that time.

National parks, like national forests, have always had the strong support of the Association, with due recognition of the basic differences between the two. It has been particularly insistent on the maintenance of high standards of quality for national parks, and in 1928 it vigorously opposed the creation of the proposed Ouachita National Park in Arkansas as not meeting such standards.

It has opposed with equal consistency and vigor the use of national parks for other than scientific and recreational purposes. Examples are its opposition in 1909 to the construction of a reservoir in Hetch-Hetchy Valley in the Yosemite National Park, and in 1938 to the diversion of water by a tunnel from the Yellowstone National Park to the Snake River. In 1943, when strong pressure was being exerted on Congress to permit logging in parts of the Olympic National Park, the directors stated that "the Association has always stood, and still stands, firmly against any economic use of the resources of the national parks. . . . Only when all other sources of supply have been explored and found inadequate to meet the war emergency should any of the forests in the present Olympic Park be sacrificed. If such sacrifice is necessary to win the war, the areas on which the timber stands should be eliminated from the park and returned to the national forest. We believe that by this method a substantial area of the primeval forest can be preserved intact, and the high standards of the national park system be maintained."

Mining Laws and the Public Lands

Abuses under the mining laws were recognized as early as 1903, when A.F.A. resolved, "That the existing laws under which mineral entries are made within forest reserves are a menace to the reserves, and that said laws should be so modified as to prevent mineral entries for other purposes than the development of mineral resources, while affording to the *bona fide* prospector full opportunity to perfect a mining claim."

A serious campaign to remedy

the situation was started in 1952 with a series of articles on the subject in *American Forests*. The 1954 Program for American Forestry recommended that " Congress revise the federal mining laws to prevent their abuse by claimants or patentees who use their claims to tie up more valuable timber or other surface resources than they legitimately need to develop the minerals." Later in the year the directors instructed the staff to attempt to obtain legislation to this effect.

Previous efforts in several quarters to achieve the same objective had been stymied so successfully by the mining industry as to make the attempt look hopeless. It was therefore a real achievement when the executive director succeeded in getting complete agreement between representatives of the mining industry and of government agencies on the draft of a remedial bill that was promptly approved by Congress on July 23, 1955. The act removed common varieties of pumice, pumicite, and cinders on public lands from the operation of the mining laws and authorized their disposal, along with sand, clay, stone, gravel, and vegetative materials, by the Secretary of the Department having jurisdiction over the lands in question. It also authorized the government to dispose of timber and other surface resources on mining claims hereafter located; and it provided procedures by which existing rights to the use of timber and other surface resources can be canceled or waived on inactive, unpatented mining claims.

Land Ownership Studies

A problem in which A.F.A. has taken a long and continuing interest is that of forest land ownership. While it has consistently supported the ownership of considerable areas by the federal and state governments, it has always regarded private ownership of the bulk of our forest area as desirable. It has also recognized that changing conditions may call for changing patterns of ownership, and for the last twenty-five years has been urging thorough and impartial study of the situation.

The 1947 Program for American Forestry recommended specifically "a state-by-state study of the desirable relationships between federal, state and private ownership, with a view to mutual understanding and agreement among all classes of forest owners as to further federal and state acquisitions."

In 1953 the directors, after asserting that "the essential integrity of [the national forests] must be preserved as part of our basic national policy," expressed the belief "that the national forests would be strengthened by a realistic and impartial review of their boundaries, state by state, in the light of the progress in forest management and other pertinent considerations including watershed protection, wildlife and recreational use.

"This review should provide factual information upon which to project the pattern of desirable national, state and private forest land ownership in the foreseeable future. When approved by the Secretary of Agriculture, the state review should guide the future course of the Department in respect to national forest additions or eliminations."

A year later (1954), the Association's revised Program for American Forestry recommended that:

"1. Early action be taken by the Congress to establish a joint Congressional Committee . . . whose objectives would be:

"a) To consider a desirable pattern for ownership of federal, state and private forest, range and other conservation lands.

"b) To formulate policies to guide action of public agencies toward achieving this pattern.

"c) To recommend to the Congress legislation needed to enable Federal agencies to implement these policies.

"2. Early action by the governor of each state to appoint a representative committee to report on the conditions in his state as they may relate to items a), b), and c) above, and render a report which will be made available to the joint Congressional Committee."

State and Private Forestry

From the beginning A.F.A. has recognized that forestry in the United States must be a cooperative enterprise in which the federal government, the states, and private owners all play a prominent part. Early and continuous stress was laid on the need for strong state forestry organizations, and Col. William F. Fox credited the Association with having been responsible for the establishment of a Forest Department in New York in 1885. State leadership in fire control and tax reform was urged strongly and continuously as the essential first step to make possible the practice of forestry on private lands.

The desirability of state ownership of considerable areas was also recognized. As one means to this end, it recommended in 1895 that tax-delinquent timberlands be acquired by the state and held to form the nucleus of state forest reservations. In 1902, the Association appointed a committee "to memorialize the various state governments to inaugurate a forest reservation policy, or to extend their existing forest reservations, and to secure legislation which will complete the establishment of a proper policy throughout the states."

State leadership in other fields, such as public education, the production and distribution of nursery stock, and cooperation with private owners in the management of forest lands and in the harvesting and marketing of forest products, has always been urged. In line with this policy, A.F.A. has worked closely with the individual states in the enactment of constructive legislation and the development of sound programs of action. It has also strongly supported cooperative federal legislation such as the Weeks Act of 1911, the Clarke-McNary Act of 1924, the Cooperative Farm Forestry Act of 1937, the Forest Pest Control Act of 1947,

and the Cooperative Forest Management Act of 1950.

A.F.A. was one of the first organizations to take a position on the highly controversial subject of public regulation of cutting on privately owned forest lands. A resolution adopted at the annual meeting in 1911, after urging the states to encourage private forestry by educational efforts, demonstration forests, improved fire protection, and tax reform, continued as follows: "They should enforce a reasonable degree of regulation on lands where the direct influence of the forests on streams and erosion is clearly proven, but they should put the interpretation of such regulations in the hands of a qualified forester, with power, and with sufficient assistance, to insure full enforcement."

There was no real attempt on the part either of the Association or others to apply this principle in practice until 1919, when the Forest Service and the Society of American Foresters initiated campaigns that made public regulation one of the chief issues of the day. A.F.A. in 1922 defined its position on the subject by stating that as part of a national policy of forestry, we should aim "toward the establishment of such feasible requirements by the public in regard to private lands as may be essential to secure effective results and as will justify the public expenditures in cooperation with the states and private owners in fire protection, reforestation, research and experimentation and through other measures of assistance."

In 1939 the directors favored "the use of the police power to the extent necessary to safeguard the interest of the general public." More specifically, they expressed the view that "the regulatory power should be used by the states as rapidly as public opinion is sufficiently favorable to promise its effective enforcement to require that all forest lands not to be converted to some other use be so handled as to maintain them in a productive condition." This position has been consistently maintained.

One means to which A.F.A. has always looked hopefully for the promotion of state and private forestry is through the establishment of state forestry associations. At the Montreal meeting in 1882 it was "Resolved that the organization of Local Forestry Associations be encouraged by this Congress." The call for the 1885 meeting stated that one of the objectives of the Congress was to promote and assist the formation of local state forestry associations. In 1902 the Association authorized and directed its vice-presidents "to appoint committees in their respective states for the purpose of organizing forestry associations. . . ."

As a means of facilitating the exchange of ideas and experiences between state associations, A.F.A. was instrumental in 1949 in organizing the Council of State Forestry Association Executives, which has met regularly since that date. In 1948 the Association entered into a cooperative agreement with the Ohio Forestry Association under which it provided guidance, planning, and financial assistance in developing both a short-range and a long-range forestry program in the state.

Forest Protection

Protection of forests from fire, insects, and disease has always been a cardinal policy of A.F.A. Typical of its attitude is a resolution adopted in 1895: "That the question of dealing with forest fires is still the first and most important one to be settled in nearly all the states of the Union before rational forestry methods can become practicable."

The annual meeting in 1909 was styled an "Anti-Forest Fire Congress." Professor H. H. Chapman, in behalf of a committee of which he was a member, presented a detailed list of activities required in the prevention and control of forest fires, which was adopted by the Association as its platform.

When the menace of the chestnut blight became apparent, A.F.A. at its annual meeting in 1912 urged the taking of vigorous action, with adequate appropriations, to bring it under control. The next year the Association urged liberal federal and state appropriations for control of the white pine blister rust, and also the continuation of financial cooperation with the states in fire protection under the Weeks Law. A few years later it proposed a national quarantine on plants, trees, and nursery stock, and in 1922 it urged Congress to give serious consideration to the broad problem of insect control and to appropriate adequate funds for this purpose. From 1933 on, the Association played a prominent part in obtaining appropriations to fight the Dutch elm disease.

The Association's most ambitious and most successful undertaking in the field of forest-fire control was the Southern Forestry Educational Project. The primary objective of the project was to create an "enlightened public sentiment in respect to the evil of forest fire," with the ultimate objective of obtaining public action. A special fund of $186,000 was raised for the conduct of the project, which was initiated in September, 1928. For the next three years the "Dixie Crusaders" with several trucks, exhibits, and moving pictures showing local conditions toured the states of Georgia, Florida, Mississippi, and South Carolina portraying with telling effect the evils of unrestrained forest fires.

Real progress in fire control in the South dates largely from this venture, which demonstrated that the only permanent solution of the fire problem lies in the education of the people, and particularly of the children. Recognizing the continuing seriousness of the problem, A.F.A. and the Louisiana Forestry Association joined with the organized forestry interests throughout the region in staging a Southern Forest Fire and Woods Arson Conference in New Orleans in April, 1956. The Conference, which has the formal endorsement of the Governors of the Southern States, will stress the devastating effects of wildfires upon the economy of the South and will arouse a militant public opinion for their control. It constitutes an appropri-

ate and effective follow-up of the pioneer efforts of the "Dixie Crusaders."

As the relative damage by insects and diseases increased, so did the A.F.A.'s interest in their control. It was influential in obtaining passage of the Forest Pest Control Act of 1947, and in 1950 it organized a Forest Pest Advisory Committee. That committee joined with the Association of State Foresters in 1951 in asking the Secretary of Agriculture to appoint a national, forest insect and disease advisory committee which would serve as a nucleus around which cooperative action could be rallied throughout the country. Among other activities it has urged the extension of fundamental and coordinated research and the development of a nationwide system of reporting on current insect and disease conditions and outbreaks.

Both the 1947 and the 1954 Programs for American Forestry stressed strongly the need for intensified efforts by all agencies to control forest fires, insects, and diseases as basic to long-range forest management.

Education and Research

Crystallization of public opinion through education has always been one of the main objectives of the Association. In 1894, for example, it urged "national legislation looking toward the establishment of courses of instruction in forestry in such institutions as are benefited by aid from the public treasury, and the establishment of a National Forestry School in some part of the national domain." It also considered informally the desirability of establishing a postgraduate school of forestry in connection with the Division of Forestry in the Department of Agriculture. A bill for this purpose which was later introduced in Congress got nowhere, but the proposal was the precursor of the present highly successful graduate school in the Department.

Greater attention to both teaching and research at land-grant colleges has been urged repeatedly by the Association. The 1954 Program for American Forestry recommended the general strengthening of professional, subprofessional, and vocational training in forestry by educational institutions.

Particular stress has been laid on the need for accurate information on the forest resources of the country. The nationwide forest survey which was finally authorized by Congress in 1928 was foreshadowed as early as 1895, when the Association resolved that "knowledge as to the extent and condition of our forest resources" is essential and should be acquired. In 1898 it urged Congress to appropriate funds to enable the Division of Forestry to gather statistical information of a reliable character on the kinds and quantities of timber in all the states and territories. Again, in 1908, it recommended the taking of a timber census of the United States.

In 1942 A.F.A. decided that it would itself undertake a critical and impartial appraisal of the forest situation, with particular reference to its changing status under war and post-war conditions. This ambitious undertaking was financed by cash contributions and services supplied by interested individuals and agencies. The results of the appraisal, which was actually started in January, 1944, and continued for somewhat more than two years, in close cooperation with the concurrent Forest Service "reappraisal," were published in the September, 1946, issue of *American Forests*. This followed preliminary reports on the various states in earlier issues of the magazine as the work progressed.

Publications and Special Projects

Undoubtedly the most important single activity of the Association has been the publication of its magazine. In 1889, *Forest Leaves*, the official organ of the Pennsylvania Forestry Association, became also the official organ of A.F.A. Then on January 1, 1898, it took over publication of *The Forester*, which had been edited and published since January, 1895, by John Gifford—first as the official organ of the South Jersey Woodmen's Association and later as the official organ of the New Jersey Forestry Association. From that day to this, the magazine, under various names, has been the mouthpiece of The American Forestry Association and the chief instrument for carrying on its educational program.

In 1910 the directors reported that they had perfected plans for cooperation with the National Conservation Association which had been organized the previous year, and that the Association would go forward with its work along the lines followed for many years, "publishing a magazine that will be a great educational force and a reliable authority in its field, striving for legislation that will promote the preservation and cultivation and wise utilization of our forests, together with all allied work for the conservation of natural resources, so much of which so far as soils and waters are concerned, comes back to the forest ultimately." The next year (1911) the National Conservation Association discontinued publication of its magazine *Conservation* because it felt that it had more important work to do, and turned current subscriptions over to *American Forestry*.

It has also undertaken many special projects in a wide variety of fields. Three projects of special importance were the holding of national forest congresses in 1905, 1946, and 1953. The purpose of the 1905 congress, as stated in the official call, was "to establish a broader understanding of the forest in its relation to the great industries depending upon it; to advance the conservative use of forest resources for both the present and future need of these industries; to stimulate and unite all efforts to perpetuate the forest as a permanent resource of the nation." The Congress was a noteworthy affair which probably deserved the encomium bestowed upon it in the preface to the Proceedings, as "not only the most important meeting ever devoted to forestry in the

United States, but one of the most influential gatherings that has given its attention to an economic subject. It is not too much to say that from the date of this Congress forestry has come to have a new meaning to the American people."

Following the completion of the Forest Resource Appraisal, the Association called an American Forest Congress to be held at Washington, D. C., October 8 to 11, 1946. Its purpose was "to dramatize to the American people the condition of their forest resources after four years of war, to bring together representatives of government, industry, agriculture, labor and the public for joint consideration of the forest situation, and to enlist the aid and support of all citizens interested in the preservation and use of forests in formulating a national program of forestry." The discussions centered around a Program for American Forestry which had been prepared the preceding July by the "Higgins Lake Committee" consisting of nineteen members drawn from all major fields of forest interests. This program was revised by the directors in the light of the discussions at the Congress and early the next year was approved almost unanimously in a referendum vote by the membership of the Association.

Rapidly changing conditions led the Association to call another American Forest Congress which met at Washington, D. C., October 29 to 31, 1953. The new Program for American Forestry presented for the consideration of the Congress was prepared by a second Higgins Lake Committee, with much the same membership as its predecessor. The program in slightly revised form was submitted to and approved by the membership of A.F.A. in the spring of 1954. It stressed three immediate goals for national policy:

"1. To meet the essentials of forest protection. . . .

"2. To improve the national timber crop in volume and quality to a degree sufficient to wipe out all deficits and build up a reserve. . . .

"3. To obtain the maximum of economic and social services from our forests by realistic application of the principle of multiple use in their management."

The program concluded with the statement that "the American Forestry Association accepts responsibility for publicizing and obtaining general acceptance of this program and for advancing its recommendations nation-wide by state and national actions as they appear practicable."

Related Fields

As time has passed, A.F.A. has found itself increasingly interested and active in fields related to forestry. Thus, in 1908, the directors called attention "to the broadening scope of the forestry movement, to the recognition of the fact that it includes the questions of irrigation, drainage, inland waterways, and power conservation." In 1911 they stated that "the center and source of the conservation movement was forestry. . . . Therefore we conceive the field of our Association to be vital and lasting and so broad, many-sided and far-reaching as to amply justify the existence of an association devoted to the advancement of scientific forestry for the best utilization of our forest lands for all time."

A statement of policy adopted by the Directors in 1942 declared that "the Association should concentrate its activities primarily in the fields of forestry and range management, while at the same time maintaining a sympathetic interest in other phases of conservation and land use." As a result of this attitude A.F.A. has frequently supported programs and legislation dealing with such subjects as range management, soil conservation, outdoor recreation, wildlife management, water pollution, control of erosion and floods, and river-basin development.

In recent years the Association has supported strongly the principle of multiple-use land management. The 1947 Program for American Forestry advocated "full recognition of wildlife, watershed, recreational and other non-timber values in the acquisition and management of forest lands by public agencies"; and the 1954 Program dealt specifically and in considerable detail with these values.

Foresters and the Association

Numerically foresters have never constituted an important part of the American Forestry Association. As a popular organization, its membership has naturally been made up chiefly of persons with a strong but nonprofessional interest in forestry, and with a keen perception of its significance to the welfare of the nation. It is, however, surprising that a larger percentage of professional foresters have not more actively supported the Association through membership.

In spite of their small numbers, foresters have always played an important part in determining the policies of the Association. Among those who were particularly active in its early years were B. E. Fernow, Gifford Pinchot, Henry S. Graves, Filibert Roth, W. L. Hall, and P. W. Ayres. At no time in its history has A.F.A. been without at least one, and usually several, foresters on its Board of Directors. For the last forty years the number has usually run from four to six. Of these, W. B. Greeley apparently holds the record for length of service, with thirty-four years to his credit.

Only two foresters have served as president of the Association—Henry S. Graves, second American to obtain a professional degree, from 1923 to 1924 and 1934 to 1936, and Don P. Johnston, an early day member of the U. S. Forest Service, since 1952. The general policy has been to select outstanding laymen for this important position. Among the incumbents have been a commissioner of agriculture, two secretaries of agriculture, three governors of states, an ambassador, a university president, and many other eminent men.

In 1908 Secretary of Agriculture James Wilson, who had been president of the Association for ten years, declined to serve further in that capacity on the ground that

it should be completely independent of the federal government. Since then, only three men (W. B. Greeley, E. L. Demmon, and C. A. Connaughton) have been members of the board while in federal service. Except for this discrimination against the federal government, nominating committees have attempted to include in the board representatives of state agencies, educational institutions, timber growers and manufacturers, and the various branches of forestry and other conservation activities with which the Association deals, together with prominent and well-informed lay citizens who represent the general public.

The first professional forester to be empoyed by A.F.A. was Ovid Butler, who on May 1, 1922, assumed the position of forester, with the duty of serving as the expert of the Association in its technical work and as its representative in its public forestry activities. On January 1, 1923, he became secretary (later executive director) of the Association and editor of its magazine, which positions he held until his retirement on March 31, 1948. He was succeeded as forester by S. W. Allen, G. H. Collingwood, and A. G. Hall, and as executive secretary by J. F. Kaylor, S. L. Frost, and Lowell Besley, all of whom are professional foresters with distinguished records of service.

Conclusion

The record shows that for eighty years The American Forestry Association has steadfastly stuck to its self-assumed task of making forestry in the United States a reality —from 1875, when its was a voice crying in the wilderness, to 1955, when hundreds of organizations, public and private, are seeking the same end. Its goal was well stated by Henry S. Graves in 1923: "To carry forward the movement of forestry to definite practical achievement. . . . I have accepted the position of President of the American Forestry Association because I believe that this is the national organization that can most effectively carry forward this movement."

Dean Graves added that there are three ways in which the Association can achieve its purpose. These are by serving as a great educational agency, by organizing all the educational forces of the country, and by taking leadership in matters of public policy. In all of these ways the Association has sought, with substantial success, and always in full cooperation with other agencies seeking the same ends, to create widespread public understanding and support of forestry and to obtain the passage of constructive forest legislation.

The Association has been criticized at different times, and occasionally at the same time, as being under the control of some special interest such as the Forest Service or the forest industries. These opposing criticisms make it evident both that the Association has pursued a middle course and that it has stuck to its convictions. The very fact that its directors are deliberately selected to represent a wide variety of interests means that it will not be controlled by the extremists of any stripe. If this policy has elements of weakness, it has even more elements of strength, since it enables the Association to represent and to command the support of the American people as a whole rather than of any single faction.

Dr. Fernow in 1898 summed up the contribution of The American Forestry Association to American forestry in these few words: "No one man or set of men can exert a controlling influence in any line, but in forestry this Association has been the prime mover." Since that time many other organizations have played prominent and often decisive parts in the advancement of forestry in the United States. As the movement has grown, it has become increasingly difficult to credit successive achievements to any single agency, group, or individual. This much, however, is clear—that The American Forestry Association has consistently exercised constructive leadership in the educational and legislative fields. If its future record maintains the standard of the first eighty years, the nation will continue to owe it much.

Manual of Silvics Being Prepared

The silvical characteristics of important American forest trees currently are being summarized by the experiment stations of the Forest Service. Subsequently it is planned that these summaries will be combined, with introductory and background material, into a U. S. Department of Agriculture publication comparable to the *Woody Plant Seed Manual*. The project has been organized by the Forest Service's Washington office Division of Forest Management Research, F. H. Eyre, chief. Technical editor for the publication will be H. A. Fowells of the same Division.

The purpose of the publication is to make available in one place the silvical information now scattered in numerous publications and in unreported data collected over the years by the Forest Service. The manual, which will include about 130 trees, should be of great value to silviculturists and forest managers.

Tax Assessment of Forest Land and Timber Shows Improvement

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FOREST land in private ownership comprises more than one-fifth of the land area of the United States. Although special tax laws in a number of states apply to timber and forest land, the area withdrawn from operation of the general property tax has been relatively slight. Forest land subject to the property tax probably makes up at least 20 percent of the Nation's land area. The value of the commercial timber stand subject to payment of property taxes is difficult to estimate with accuracy, but this value may well exceed $10 billion. Hence the assessment of forest land and timber for taxation is in the aggregate a very big task.

For a number of reasons forest assessment has received less study in this country than has the assessment of many other types of property. From the standpoint of the assessor, adequate tax maps have frequently been lacking with the result that forest lands have been difficult to identify. Again, timber appraisals often present technical problems with which local assessors may be poorly equipped to deal. Timber volumes, moreover, are unevenly distributed, and forest lands make up a relatively small part of the local tax base in many parts of the country. In such areas the assessor naturally tends to concentrate upon higher valued farm lands and improvements.

From the forest owners' standpoint, property taxes have in general been less onerous in recent years. This has resulted in part from the tendency for property taxes to lag behind the upward movement of timber values and the general price level during inflationary periods. In addition, rising federal income tax rates have lessened the impact of property taxes indirectly, since the latter may be deducted from gross income in calculating federal income tax liability. Even when forest tax questions do come to the fore, attention is apt to be focused more upon special forest tax legislation than upon the less dramatic problem of improved assessment administration under the property tax.

Assessment has been called the heart of the property tax, since it determines how well or how poorly the burden of the tax is to be distributed. The lack of up to date information on forest assessment practices throughout the country led the Forest Service to undertake a study of state instructions for the assessment of forest property.[1] The study, carried out with assistance from state tax commissions, is similar to one made by the Forest Service in 1941 (*21*).

Findings of the study are summarized in this article and serve not only to measure changes that have occurred over the past 15 years but also to point the way to future development. The object has been to include references to assessment guides in effect or in active preparation on April 1, 1955.

Actual assessment instructions or excerpts therefrom, arranged by state, have been compiled separately in processed form. Copies of this material entitled "State Guides for Assessing Forest Land and Timber—1955" may be obtained upon request from the Division of Forest Economics Research, U. S. Forest Service, Washington, D. C.

[1]By "forest property" was meant all privately owned land and timber even though forming part of a farm or other nontimber enterprise. The study did not include special forest tax legislation such as bounty, exemption, rebate, yield tax, or severance tax laws.

TABLE 1.—FOREST LAND AND TIMBER COVERAGE IN ASSESSMENT INSTRUCTIONS, 1941 AND 1955

Extent of coverage	Number of states 1941	1955
Very brief[1]	7	10
Brief[2]	3	6
Extended[3]	2	8
Separate timber manual	--	3
Total	12	27

[1]Forest land and timber barely mentioned; coverage usually not more than one paragraph.
[2]Coverage of two paragraphs or more, up to roughly one page.
[3]Coverage of more than one page in general assessment instructions or equivalent.

Findings of the Study

Progress has been made over the past 15 years both in the number and quality of forest assessment instructions. As shown in Table 1, the number of states providing "very brief" instructions[2] has increased from 7 to 10, states providing "brief" instructions have increased from 3 to 6, and those with "extended" instructions from 2 to 8. In addition, three states have issued or have in active preparation separate manuals dealing with the assessment of timber. In all, 27 states now provide some forest assessment guides as against 12 states at the time of the earlier survey. It can no longer be said as in 1941 that "in almost all States official instructions either are entirely lacking or are wholly inadequate." Even though practice frequently falls short of theory, the need for improved forest assessment is gradually being recognized.

The extent of coverage is listed below by state.

Very brief instructions:

Connecticut	New Jersey
Maryland	Ohio
Minnesota	South Dakota
Mississippi	Texas
Missouri	Utah

[2]Terms, which follow those used in the 1941 survey, are defined at the foot of Table 1.

Brief instructions:

Illinois	Maine
Indiana	Pennsylvania
Kentucky	West Virginia

Extended instructions:

Colorado	New York
Louisiana	North Carolina
Michigan	Oregon
New Hampshire	Wisconsin

Separate timber manual:

California	Washington
Idaho	

Description of the more detailed instructions now in effect is of interest. Comments are confined to states in the "extended" and "separate timber manual" groups.

Extended Instructions

In *Colorado* only four timber producing species are recognized for assessment: ponderosa pine, lodgepole pine, Engelmann spruce, and Douglas-fir (*6*). Distribution of merchantable timber has been indicated on maps in the state forester's office and assistance is available to assessors in locating timber in their counties. The total assessed value of a given tract is found by adding land value and timber value, the latter determined on the basis of volume multiplied by a preinflation unit price per thousand board feet with allowances for road construction and hauling costs. To have value for assessment, timber stands should average at least 1,500 board feet per acre in trees of 10 inches or greater diameter measured 4½ feet above the ground. The manual suggests determination of timber volume by use of 1/5 acre sample plots.

In *Louisiana* under recent legislation standing timber, other than virgin timber, is exempt from general property taxes and is subject instead to a nonoptional yield tax at time of harvest. Forest land, however, remains subject to the property tax and under the recent law, effective January 1, 1955, must be classified for assessment into one of the following four classes: tidewater cypress land, hardwood land, longleaf pine land, and other pine land (*15*). At the time of the survey, assessment instructions previously in effect had not yet been revised in accordance with the new legislation.

Michigan has been revising its assessment manual and it is understood that this will contain a section providing instructions for forest land and timber valuation and appraisal. The new manual had not been published at the time this article was prepared.

New Hampshire exempts standing timber from payment of property taxes and levies instead a nonoptional yield tax. The bare land value, however, remains subject to the property tax. While the state issues no assessment manual, suggestions relating to the assessment of forest land are provided in the form of questions and answers prepared by the Tax Commission (*23*). In determining value of cut-over land, it is suggested that the following factors be considered: location, adaptability to grow timber, soil quality, possible alternative uses, proximity to farms and villages, type of road, and location with respect to markets. A Timber Tax Study Committee appointed by the governor recommended in 1954 that a guide to bare land assessment be made available to selectmen as an aid in classifying and valuing land on the basis of its productive capacity and location (*24*).

In *New York* the State Board of Equalization and Assessment conducts training schools where forest assessments are considered and the board assists assessors through correspondence and conferences. In addition, training sessions are held by the New York State Assessors Association and by the Association of Towns. A discussion of forest assessments was delivered before the latter association in 1954 (*5*). No manual instructions covering forest assessments have yet been prepared although this is contemplated.

New York is faced with a special problem in that real estate taxes are paid on extensive areas of state-owned forest lands. In this connection and in reviewing state equalization rates, the board states that an appraisal of forest land in 81 towns has recently been completed. In all, some 6 million acres in the Adirondack and Catskill areas were covered. The board has the services of full time foresters.

In *North Carolina* the Institute of Government at Chapel Hill has prepared an assessment manual that devotes a chapter to the assessment of timber and forest land (*14*). Tables are provided for classifying bare land and timber with the expectation that a county valuation committee and a forest advisory board will establish base values per acre for the guidance of local assessors. The classification of bare land is based on soil productivity and accessibility. Timber is classified on the basis of forest type, quality, stand size, and degree of stocking, with adjustment for accessibility. The North Carolina guides are experimental in nature and have not been officially adopted by the state.

In *Oregon* one or more foresters serve on the staff of the State Tax Commission and timber appraisal service is available to county assessors. In-service training courses are held at which timber assessments are discussed and frequent references to timber assessment are contained in the monthly bulletin of the Valuation Division. Formal manual instructions covering forest assessments have not as yet been issued. Under recent legislation (*25*) the State Tax Commission is required to appraise forest land and timber at county expense unless the county makes such appraisals and maintains records thereof acceptable to the commission. It should be noted that the assessment function itself remains with the county.

In *Wisconsin* assessors are required to sub-classify lands in the "agricultural," "swamp, cut-over and waste," and "timber" classes for the purpose of applying unit prices in building up values in those classes (*31*). A somewhat detailed classification is provided including "mixed timber" (lands growing a mixture of hardwoods and softwoods) and "wood" (lands growing trees suitable only for cordwood, firewood, bolts of

various kinds, etc.). In the northern forested portion of the state, assessors are furnished with a forest products price review compiled semiannually by the Extension Forestry Office, University of Wisconsin. This may be used as a guide in determining stumpage values.

Separate Timber Manuals

California, Idaho, and Washington comprise the group of states with separate manuals covering forest land assessments, the California manual being in course of preparation at the time of the present study. The Idaho manual (*12*) of 24 pages establishes four timber land classes and provides normal values based in part on sales data for the period 1937-41. Base values per thousand board feet are provided for merchantable timber. These values are subject to adjustment for site quality and density of stocking. A section of the manual contains instructions for timber cruisers using the 10 percent cruise by line-plot method. The manual appendix provides volume tables, average cull percentages for various species, and other data.

The State of Washington manual (*29*) of 70 pages was prepared at the request of the legislature in 1951 and contains detailed instructions. The appraisal of bare land, nonmerchantable timber, and merchantable timber are treated separately for western and eastern Washington. Numerous tables are provided giving 1952 unit values based upon forest land quality, access and topography, timber quality, and other factors. Volume tables are given for various species. Suggestions for improvement of inventory procedures by county assessors include discussion of aerial photographs, log grading and quality cruising.

Other Evidences of Interest

Aside from better assessment instructions there have been other indications of interest in improving forest assessments. The National Association of Assessing Officers considered timber assessments at its annual conference in 1950 (*13*) and again in 1953 (*28*). Eubanks has discussed use of photogrammetry in forest taxation (*8*) and Aandahl, Murray, and Scholtes have studied the economic rating of soils, including woodlands, for tax assessment (*1*). A number of state forest tax studies, moreover, have dealt with the assessment problem. Among such studies are those of Malone (*17*) and Sewall (*16*) in Maine, Zumwalt (*32*) in Connecticut, Besley (*3*) in West Virginia, and Rothery (*27*) in the Pacific Northwest. The most exhaustive analysis of forest assessment problems remains that of Fairchild twenty years ago (*9*). No bibliography that treats primarily of forest assessments was found since that of Nelson (*20*) although useful references are contained in the revised Assessment Study Guide (*19*) of the National Association of Assessing Officers.

Assessment in Practice

The ultimate objective is not to get better practices into the manuals and into the literature but to get them into the woods. To what extent this is taking place is hard to say, since practices vary from county to county even within a given state. One tax commission stated frankly that assessment suggestions are not being generally followed and that no consistent procedure for the assessment of forest land is being used. A state offering technical assistance in timber appraisals reported that no requests for such assistance had been received and that it was doubtful if any use had been made of the assessment suggestions provided in the manual, forest assessments usually being determined arbitrarily. Further indication that forest assessment practices need improvement was found in a recent study of national forest contributions to local governments (*30*).

Over against the evidence just cited must be set the fact that in many counties assessors are availing themselves of manual aids, in-service training opportunities, and technical forestry assistance. In an eastern state with an extensive commercial forest area, for example, it was felt that they were moving rather rapidly toward more realistic forest assessments.

That assessment instructions, once in the manuals, are being applied only gradually is hardly surprising. Not only natural inertia, but lack of funds, shortage of personnel, and legal obstacles may all stand in the way of needed changes. One state pointed out, for instance, that real property including standing timber is subject only to quadrennial assessment. Therefore, the assessed value of a forest tract cannot be raised until the next general revaluation, even though it may be lowered in any year following timber cutting. Because of this many counties in that state assess forest lands at a uniform rate per acre regardless of variation in value.

Although it is abuntantly clear that improved assessment instructions are only a step toward better practices in the field, they are an essential step. Progress has been made over the past 15 years and it is continuing.

Trends in Forest Assessment

Along what lines is forest assessment likely to advance in the years ahead? In the first place, there can be little question that continued improvement of assessment administration in general will be reflected in more scientific assessment of forest properties. A recent study by Murray (*18*) lists the more pressing assessment problems of an overall character. These include local and inter-county uniformity, achieving and holding a desired level of assessment in relation to value, county versus township assessment units, appointed versus elected assessors, and state assistance to local assessors. Among specific suggestions for improvement were adequate maps, soils and cost data, card systems, benchmark appraisals, and assessment-sale ratio studies. The need for reassessment programs, in-service training, research, and use of advisory committees was also stressed. The progressive realization of these objectives can hardly fail to be reflected in the woods.

In addition to a general improvement in assessment practices, at least five trends may be noted relating particularly to forest assessments. These are: increased emphasis upon state leadership, greater use of aerial photography, separate assessment of land and timber, land classification based on capability and other factors, and greater selectivity in timber classification.

State leadership in assessment administration may range all the way from outright assessment or appraisal at the state level, as is sometimes the case with public utility properties, through varying degrees of field or office aid for local assessors to issuance of manuals or other guiding instructions. Oregon has probably gone the farthest by requiring the state to appraise timber in counties that are not equipped to make such appraisals locally to the satisfaction of the State Tax Commission. Certain other states offer voluntary timber appraisal service to local assessors. This may be provided by full-time foresters on the staff of the state tax commission or by part-time consultants from the state forester's office. The growing availability of forest instructions in general assessment manuals and in separate manuals has been described. A further gradual increase of state leadership in the field of forest assessment appears likely to take place.

Aerial photography has been used in various phases of tax assessment work for some time (*26*) and can be particularly useful in forested areas (*8*). Tax maps showing property boundaries, areas, and plot numbers may be readily prepared by this means. Photo interpretation yields information as to land use and capability, slope, erosion, and plant indicators. Forest types, stand size classes, density of stocking, and other data of interest to the assessor may also be derived. Factors of cost may make aerial photography, supplemented by ground surveys, the only practical method of developing improved assessment systems on certain lower valued forest lands (*17*).

Separate assessment of land and timber is needed if standardized assessment procedures are to supplement the individual judgement of the assessor. In the larger cities standardized assessments making use of unit values per front foot or square foot with allowances for depth, corner, and alley influence, etc., in the case of land, and cubic foot or other unit values for improvements have long been used. Individual-judgement assessments on the other hand have been more usual in smaller communities and rural areas (*4* at p. 480). Examination of assessment manuals shows increasing emphasis upon standardized assessment of farm lands and improvements. Even though the lower valued forest lands have lagged behind farm lands in this development, we may expect a similar trend.[3]

Land classification can serve as a useful tool in rural assessment (*7*). The land capability classes used by the Soil Conservation Service are frequently utilized for this purpose (*11* at p. 152). Of the eight capability classes, all but one (Class VIII) include timber production as an acceptable land use. Class VIII is intended for land that is not suitable for cultivation, pasture, or timber production but which may have value for wildlife, recreation, or watershed protection. Classes I through IV apply to lands suitable for cultivation and classes V through VII to land suitable for pasture and woodland or woodland alone. A rough classification such as that above may be sufficient in some cases, in others greater refinement is needed. Bratton, for example, has suggested (*5*) a bare forest land classification based on accessibility and site quality.

Timber classification for assessment will necessarily vary by region and forest type. Frequently "young growth" and "merchantable timber" alone have been used. Bratton suggests use of four factors: tree species, timber volume per acre, timber quality, and location with respect to roads. In some areas logging conditions and other factors may also have to be taken into account. The development of more selective assessment classifications for timber can be expected.

[3] See in this connection "Basis and procedures of forest-property-tax assessment" by Paul E. Malone, contained in *Research in the Economics of Forestry*, Duerr, William A., and Henry J. Vaux, editors. Charles Lathrop Pack Forestry Foundation. 1953.

A Question for the Future

Underlying all tax assessment is the concept of value itself. "Fair market value" (as variously interpreted by the courts) is the usual requirement for assessment under the general property tax. This yardstick, however, is often hard to apply to timber and forest land. Immature timber may not be sold in the open market with sufficient frequency to establish a going price. Planted forest areas represent a valuation problem of their own. It may be economically practical to log mature timber in large blocks only over a period of years, and the difference between the so-called *en bloc* or "wholesale" value on the one hand and the "retail" value for current harvest on the other (*27*), has been recognized by the Tax Court of the United States (*2*).

Valuation of forest tracts for assessment at a figure that takes into account sustained yield earning capacity as closely as possible is a goal much to be desired. The use of past or probable future earnings as an aid in determining the fair market value of certain types of property is not uncommon and in some cases has been specifically authorized by law (*9* at p. 103; *32* at p. 52). While capitalization of net forest income, either actual or estimated, as a basis for forest assessment could raise legal and practical difficulties, these are not necessarily insurmountable. Such methods are in use in other countries (*9, 10*) and have been proposed for use here (*16*). It may well be that this approach to forest tax reform merits further exploration as we continue to move toward a sustained yield forest economy in the years ahead.

Conclusion

The general property tax, although losing ground relatively as a source of tax revenue in the United States, has remained dominant as a source of local government revenues (*22* at p. 49) and this situation seems likely to continue in the foreseeable future. When maladjustments in forest taxation have appeared, either of two solutions has traditionally been attempted. The first has been enactment of special forest tax laws such as yield taxes that remove in whole or in part standing timber, and in some cases bare forest land also, from the operation of the property tax. The second has been to seek improvement in assessment administration or modification of existing practice, within the framework of the property tax.

The former treatment, giving promise of a rapid cure, has frequently had the greater appeal. The second, that of keeping timber and forest land within the property tax system and seeking to improve its operation, deserves continued attention.

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Erratum

Inadvertently the listing for Penta Post and Treating Company was omitted from the Consulting Foresters Directory published in the January issue of the JOURNAL OF FORESTRY. It is as follows:

Penta Post and Treating Co., Box 5, Tuttle, Idaho and 6806 Fairfield, Boise, Idaho.

Consultants: Vernon Ravenscroft, Steele Barnett.

Territory: Idaho.

Specialization: 1, 2, 3, 4, 6, 14, 15, 16, 17, 18, 19.

Intermediate Yields of Douglas-Fir as Interpreted from British Yield Tables

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THE probable yields obtainable from even-aged immature stands of timber under intensive thinning regimes is of ever-increasing interest to foresters. In recent years numerous projects have been initiated to demonstrate the results of periodic thinnings for many of the major species of the Northwest. Some short term results of these projects have been published but very few cover more than one thinning period. A few attempts have been made to forecast expected yields under management from the limited data accumulated from local thinning trials and European experience. A recent example of this is the schedule prepared by Heiberg and Haddock (*5*). Many more data must be acquired from long-term repeated treatments before any complete presentations of expected local yields will be possible. In the meantime there is much to be learned from the results obtained in Europe where intensive management has been the rule for many years.

As early as 1928 the British Forestry Commission prepared a set of yield tables for the several major species favored in Britain for propagation in plantations. These tables were revised in 1953 by Hummel and Christie (*6*) and published under the title of "Revised Yield Tables For Conifers In Great Britain." Included therein are tables for Douglas-fir which has been a favorite species in forestry operations in Britain for more than 50 years. The tables are based entirely on the records of permanent sample plots and represent the actual yields obtained from plantations under intensive thinning regimes. Under similar treatment our natural well-stocked stands might be brought to a condition resembling the plantations at an early age and hence the British tables should be indicative of what is possible in Douglas-fir stands of the Pacific Northwest.

The British tables are presented in quarter-girth units of diameter, Hoppus-feet units of volume and in a form which is difficult to interpret for comparison with Pacific Northwest yields of natural stands. The writer has therefore converted the British records to standard American units of measure and has revised the form to simplify their interpretation. The partial results of this work are presented in Table 1, which shows the expected yields on British site quality Class II. This is equivalent to our site Class III, or site index 140. An intensive thinning regime is implied at intervals of three years in juvenile stands, lengthening to five years in 50-year-old stands. The periodic crops of thinnings, and the yields before and after thinning are included in the table. Stand densities before and after thinning have been added by the writer as a promising means of defining the thinning practices employed in Great Britain. The stand density measure represents the ratio of the number of trees tabulated for a given age to the number of trees which are normal in our fully stocked natural stands for the average stand diameter at that age. The normal values were interpolated from Bruce's revised tables (*2*) based on average stand diameter.

Number of trees, basal areas and volumes are on an acre basis, and include all trees in the stands. Volumes are in cubic-feet units inside bark to a top diameter of three inches overbark.

Commentary

It is to be assumed that British foresters consider the thinning regime defined by the tables as representative of a high order of management. Under this presumption there is much to be learned from them to guide our local efforts.

TABLE 1.—YIELD TABLE FOR DOUGLAS-FIR PLANTATIONS UNDER INTENSIVE MANAGEMENT
Interpreted from "Revised Yield Tables for Conifers in Great Britain," (*6*) after conversion of British units of measure to U. S. units of measure. Yields are for Great Britain site quality Class II which is equivalent to Pacific Northwest site Class III or site index 140.

Entire stand before thinning						Thinnings				Residual stand after thinning					
Age years	No. of trees[1]	Ave. d.b.h. ins.	Basal area sq. ft.	Volume cu. ft.	Density	No. of trees[1]	Ave. d.b.h. ins.	Basal area sq. ft.	Volume cu. ft.	No. of trees[1]	Ave. d.b.h. ins.	Ave. height ft.	Basal area sq. ft.	Volume cu. ft.	Density
13	1400	3.7	102	850	.80	400	3.2	23	170	1000	3.8	26	79	680	.61
16	1000	4.8	127	1600	.86	260	4.1	24	280	740	5.1	35	103	1320	.70
19	740	5.9	141	2350	.88	180	5.1	23	350	560	6.3	43	118	2000	.74
22	560	7.0	151	3000	.87	120	6.0	22	400	440	7.3	50	129	2600	.73
25	440	8.1	160	3600	.86	80	6.8	21	430	360	8.4	57	139	3170	.75
28	360	9.3	167	4170	.88	65	7.7	19	450	295	9.5	63	148	3720	.74
32	295	10.4	177	4950	.86	45	8.8	19	480	250	10.8	70	158	4470	.77
36	250	11.7	186	5650	.86	30	9.8	18	500	220	12.0	77	168	5150	.79
40	220	12.8	193	6300	.88	33	10.8	17	515	187	13.1	83	176	5785	.76
45	187	14.1	203	7000	.85	23	12.1	16	530	164	14.4	90	187	6470	.79
50	164	15.3	211	7600	.86	17	13.4	15	545	147	15.6	96	196	7055	.80

[1]There are small discrepancies between the numbers of trees reported here and those of the original tables. The revisions smooth out irregularities and/or permit better cross-checks of basal areas per acre.

Some of the major elements are outlined hereafter.

Yield comparisons.—Many interesting comparisons may be made between the total yields obtained under the thinning regime, and the yields from our natural stands. Up to the age of 50 years, the total volume of the periodic thinnings and the volume of the residual stand amounts to 11,705 cubic feet per acre. This is 1.66 times the yield of 7,055 cubic feet, which is the normal volume in natural stands of the Pacific Coast. Also of note is the fact that the yields before and after thinning at 50 years are larger than the yield of natural stands. The earlier periodic thinnings have so increased the rate of growth of the 164 reserved trees that their average diameter is 15.3 inches, and in volume these are more than the equivalent of the 430 trees averaging 9.3 inches in diameter which are normal for our natural stands (*7*). In fact, in a natural stand of the same site and age, only a few trees would have attained diameters of 15 inches or more. Were similar comparisons made for portions of the stand consisting of only those trees over a minimum merchantable size limit of 6 or 12 inches in diameter the differences in favor of the thinned stands would be far greater. In Scribner board-feet units for trees over 12 inches in diameter there would be close to 32,000 board feet per acre at 50 years before thinning, as compared with 12,400 board feet in a normal natural stand.

Spacing.—One of the means employed in Britain to define stand density in thinning operations is to relate the number of trees per acre or the average spacing distance among trees to some measure of stand height. In another publication of the British Forestry Commission (*4*) a table is presented showing the average spacing between trees for stands of given "top height," top height being the average height of the 100 tallest trees per acre in a stand. It is reported that all dependent yield variables are closely associated with top height. Close examination of the British tables over all site classes reveals too, that the dependent yield variables are highly correlated with average stand height and also average stand diameter. In fact after such correlations the additional variation attributable to site and age is very small. Hence for our use, a simple means of defining the thinning practiced in Britain is to express the number of trees per acre preserved in the residual stand after thinning either by average stand height or average stand diameter classes. Number of trees per acre may in turn be transformed into average spacing. Revision of the original British table based on top height resulted in Table 2.

A rule-of-thumb suggested by the Douglas-fir Second Growth Management Committee (*3*) as a rough guide for thinning in the Pacific Coastal region is that "the residual trees should be spaced the same number of feet apart as their average d.b.h. in inches plus a predetermined factor" of 1 for Douglas-fir. This rule agrees very closely with the tabulated spacing distances in the higher diameter ranges but it seems that heavier thinning and greater spacing is the rule in juvenile stands in Britain.

It is also interesting to compare the British regime with the standards established by Briegleb (*1*) as a guide for thinning natural stands of Douglas-fir in the Northwest. This guide establishes the number of trees which should be left on the ground to grow, according to the average height and average diameter of the stand in question. If the trees are large in diameter for their height then their crown spread too is presumed to be large, and they are capable of using a larger ground space than trees which are small in diameter for their height. On interpolating the number of trees to be left from Briegleb's table for the heights and diameters of Table 2, the values in the fifth column of the same table were obtained. The corresponding average spacing distances are given in the sixth column. Comparisons between these values and the British values indicate that Briegleb's standards would result in considerably heavier thinnings.

The data on which Briegleb's standards are based were representative of thinned and natural stands "judged to be at least reasonably well stocked." It would seem therefore, that these standards would develop trees having larger crowns in both spread and length relative to their diameter or height and hence of lower quality.

Density of stocking.—The densities of stocking before and after thinning reported in Table 1 measure the relative stocking of the British stands against the standard established by Bruce for full stocking in natural stands of the Douglas-fir region. On this basis it seems that the stands are permitted to build up to approximately 85 percent of the established normal, and then they are thinned to about 75 percent. This must represent what British foresters believe to be "room to grow, but none to waste."

The density values also throw some additional light on the rate of improvement in understocked stands. The difference between a residual stand density and the next-following before-thinning

TABLE 2.—NUMBER OF TREES PER ACRE AND AVERAGE SPACING DISTANCE AMONG TREES AFTER THINNING IN RELATION TO AVERAGE STAND HEIGHT AND AVERAGE STAND DIAMETER.

Average ht. ft.	Average d.b.h. in.	Great Britain		Briegleb's standard	
		No. trees per acre	Ave. space feet	No. trees per acre	Ave. space feet
30	4.3	900	6.8	685	7.9
40	5.7	630	8.4	520	9.1
50	7.3	435	10.0	375	10.8
60	9.0	320	11.5	278	12.5
70	10.8	250	13.1	212	14.3
80	12.6	200	14.6	167	16.1
90	14.5	165	16.2	133	18.1
100	16.4	140	17.6	110	19.8

density represents the improvement over the growth period. Thus, after thinning at age 13 the density increases from 0.61 to 0.86 at age 16. The annual rate of improvement is therefore just over eight percent. The annual rate thereafter decreases to 5 percent between 25 and 28 years of age and to approximately 2 percent between 45 and 50 years. These rates are far in excess of any estimates which have been made for our natural understocked conditions, because of the ideal spacing in the thinned plantations. In compilation of the British yield tables there has been no recognition of mortality losses which might occur between cutting dates because of windfall, snow breakage, disease, or other causes. No doubt however, such losses are salvaged as they occur and are therefore included in the total thinning crop.

Stocking densities were also evaluated from basal area relationships but these cannot be interpreted without some ambiguity with reference to these managed plantations. By comparing the tabulated basal areas before thinning with Northwest normal basal areas for natural stands the following stocking ratios are obtained: at age 19 - 1.57, age 25 - 1.33, age 32 - 1.18, age 40 - 1.09 and at age 50 - 1.03. Even after thinning all but one of the ratios are greater than one, being 1.31, 1.16, 1.05, 1.00 and 0.97 at the same ages respectively. The above values are misleading as measures of stocking density, since under the thinning regime it is to be presumed that the stands are held to a subnormal level so as to permit expansion of individual trees without competition. The reason for the discrepancies may be explained by referring to conditions at age 25. Here the 440—8.1-inch trees of the managed stand contain a larger basal area than the 1,100—4.5-inch trees which is the normal condition in a natural stand where greater competition among the trees has prevailed. The stocking ratios tabulated in Table 1, based on number of trees and average diameter would seem to be more realistic measures of density in these thinned stands.

Summary

Experience of British foresters in the intensive management of Douglas-fir plantations over a period of 50 years has enabled the preparation of reliable yield tables showing intermediate and residual crop volumes which have been actually realized on permanent sample plots. After conversion of these tables to our customary units of measure there is much to be learned from them to guide us in thinning young stands in the Pacific Coastal Region.

Examination of the tables representative of Pacific Coast site III conditions discloses that over a period of 50 years the British realize a yield of 4,650 cubic feet from thinnings with a residual stand of 7,055 cubic feet remaining on the ground. The total yield amounts to 11,705 cubic feet and is 1.66 times the yield realized at 50 years from our natural stands.

The plantations in Britain are thinned periodically at 3 to 5 year intervals to a density of about 75 percent of our normal stocking as defined by Bruce's tables (*2*) of number of trees and average stand diameter. Subsequent thinnings are taken when stocking has been rebuilt to about 85 percent. As a more practical field-guide a table was prepared to show the desirable average spacing distance between trees for stands of a given average height, or of a given average diameter.

After a thinning has been made the residual stands quickly develop again towards full stocking. The annual rate of improvement varies from 8 percent at 15 years of age to 2 percent at 50 years of age.

A complete set of tables covering British site quality classes I to IV, which are equivalent approximately to West Coast site indices of 155, 140, 125 and 110 will be available shortly upon request.

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Seed Spot Method of Censusing Forest-Rodents

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WILD MICE of the genus Peromyscus, being nocturnal and secretive, are rarely encountered in the woods, but when man attempts to reseed denuded timber lands their presence is all too obvious. Whether the seed is buried in the ground or scattered over the surface, the animals find it with equal facility.

Foresters have long wanted a simple method by which to census these unseen populations of rodents. If seed-eating animals are not present on an area that is to be replanted, control measures are wasteful; but if they do occur, then direct seeding should not be undertaken until adequate control of rodents is achieved.

Trapping, which is the usual method of censusing populations of small mammals, is not a practical one for foresters. Besides requiring considerable equipment that is not likely to be on hand, it involves a somewhat specialized technique, and unless a person is experienced he cannot be certain of his results. A different procedure is needed. One, which has been discussed briefly in the literature by Garman and Orr-Ewing (*3*) and more extensively by Moore (*7*) and Baisinger and Moore (*1*), employs seed spots in place of traps. It is based on the assumption that the number of spots that are robbed by rodents during a given period of time reflects the size of the population. If this is a reliable assumption, then the method is more suited to use of foresters than is trapping.

The technique developed by Moore for the Douglas-fir region of the Pacific Northwest was to put fifty coniferous seeds (or kernels of oats or barley) on a cleared spot of ground several inches in diameter and then cover half of them with bark. He recommended preparing ten such spots a chain apart on every forty acres of land.

After twenty-four hours the spots were examined to ascertain the number that had been disturbed. Birds ate only exposed seed, chipmunks pushed the bark aside, and shrews and mice burrowed underneath. Robbery by the last two kinds could be distinguished because shrews took only some of the seed while mice removed or hulled all of them.

An important difference between Moore's method and trapping is that, although a small mammal usually will spring only one trap before being caught, it may disturb many seed spots. Under similar circumstances more spots will be robbed than rodents trapped. In general, though, Moore believed that the number of spots robbed during one night would equal, approximately, the number of captures made in three nights of trapping.

Test of the Method

Because mice are a problem in reforestation of the Douglas-fir region of northwestern California, where extensive acreages of virgin timber are being cut, tests were made there of the practicality and reliability of the seed spot method of censusing rodents. The study was part of a cooperative investigation between the Department of Zoology of the University of California at Davis and the California Forest and Range Experiment Station of the United States Forest Service. Most of the work was done in Humboldt County near Salyer, where the population of small seed-eating mammals on logged-over lands consisted mainly of white-footed mice (*Peromyscus maniculatus* and *P. truei*) and chipmunks (*Eutamias townsendii*).

After a number of preliminary trials, a modification of Moore's technique was adopted: at each spot a few seeds were buried in a hole half an inch deep and then covered with soil. The advantage of concealment is that the seeds cannot be found by birds or removed by ants, yet evidence of robbery by a rodent is clearcut. In place of each cluster of seeds, the animal leaves a small pit.

Seeds of pine or Douglas-fir rather than kernels of grain were used so that the rate of robbery would be indicative specifically of rodent pressure against artificial seeding of conifers. The number planted per spot depended on size: about five for sugar or Jeffrey pine and ten for ponderosa pine and Douglas-fir. Experiments had shown that all four kinds are equally relished by mice.

Since the areas in most of the California Douglas-fir region on which rodent censuses are desired are small clearcut blocks not more than twenty acres in size, Moore's suggestion of only ten spots per acre was not applicable. Instead, a zig-zagging line about 1,050 feet in length was used. It consisted of one-hundred spots, with a distance of thirty feet between groups of five and six feet between spots within a group.

Usually, seeds were planted in the afternoon. Then on the following day the number of spots which had been robbed of seed was counted, and the resulting figure, expressed in percentage, was considered to be the rate of robbery for the first twenty-four hour period. Subsequent examinations gave the rates for longer periods.

From a practical consideration, it was not particularly important to know the kind of small mammal that had disturbed a seed spot. Often, though, a fair guess could be made. Mice and shrews did no exploratory digging; they dug a single, neat pit, no larger than necessary, only at the precise spot where seed was buried. Chipmunks, on the other hand, often undertook considerable exploratory digging, trampled the ground, and made large pits. The outer coats of seeds

opened by shrews had serrated edges in contrast to the even incisions made by mice (see photographs in Kangur (*4*).

On the basis of tests conducted from September to December in areas where mice predominated, it was found that in general the rate of seed spot robbery reflected the density of rodent population. Where animals were numerous, more spots were disturbed during a given period of time than where the population was small. For example, in one cut-over which, according to a live-trapping census, was occupied by twice as many animals as an adjacent forest, 48 percent if the seed spots were robbed during the first night and 77 percent by the end of the second twenty-four hour period. But in the adjacent forest, a less favorable habitat for mice, 18 percent were robbed during the first night and 44 percent by the end of the second night.

In this example there was a close correlation between results obtained by trapping and seed spot lines. Both methods indicated that the mouse population of the cut-over was twice that of the virgin forest. But usually such a close correlation did not occur. The following example is more typical.

In a cut-over where trapping had indicated that the mouse population was four times that of the adjacent virgin forest, 78 percent of the seed spots were robbed during the first night and 97 percent by the end of the second twenty-four hour period. In the forest, 43 percent of the spots were robbed during the first night and 86 percent by the end of the second night. In this case the seed spot method had clearly suggested that mice were more numerous on the cut-over than in the forest, but it had not revealed the true extent of the difference.

Although the method is useful for providing a rough measure of population density, it cannot be relied upon to give an accurate census. It is affected by too many variables: environmental, psychological, and physiololgical.

Scarcity of food increases the rate at which seed spots are robbed. In one area nearly barren of vegetation and having few insects, seed, and other items common in the diet of mice, the rodent population was low. Yet 95 percent of seed spots were robbed during the first night, and all of them by the end of the second night. In a nearby forest where live-trapping had revealed that the mouse population was slightly larger, the rate of seed spot robbery was only 30 percent in one night. These results are in line with Moore's (*6*) comment that "extremely light populations often leave indications of having taken a heavier toll of seed than far greater populations." Also, food preferences, which vary with the season of the year, may affect the rate of robbery. In the course of a study of trapping success, Fitch (*2*) found that mice, being partly insectivorous in their feeding habits, may not be attracted by grain bait when insects are abundant.

Moonlight influences the rate of robbery even more than it affects trapping results. At one place during the dark of the moon the rate was 95 percent the first day and 100 percent by the second. A month and a half later, when a full moon shone in a cloudless sky, the figures for the same seed spot line, which had been reloaded, were only 11 percent and 44 percent. Yet live-trapping showed no decrease in the mouse population.

The explanation seems to be that since mice are warier in light than in darkness, an animal which will rob many spots under cover of a black night may, when the moon is shining, stay in the open only long enough to disturb a single site. Hence on bright nights the number of seed spots robbed is greatly reduced; but because a mouse is likely to be captured by the first trap it visits, the number of animals taken by a trap line is not lowered proportionately.

Ordinarily on dark nights a seed spot line along a bare skid road has about as high a rate of robbery as a parallel line under vegetation. But some sections of some roads are almost never visited, and spots there are not robbed even though nearby ones are disturbed each time they are loaded. Strangely enough, if traps are set at these undisturbed sites, sooner or later they will capture a mouse.

Apparently within the home range of mice there are certain areas, usually consisting of bare ground, which the animals have learned are not productive of food and which lack objects, such as rocks or pieces of wood, to serve as points of attraction. I have often noticed when watching the foraging of wild mice that the routes they take are dependent upon the distribution of such objects. They go from one to another and use each as a base for short, radial excursions. Therefore, if an object, such as a trap, is placed in the center of a bare area previously not visited by mice, sooner or later the animals are certain to become aware of it and then include it in their foraging beats.

A record of the distribution of robberies along seed-spot lines is important for the correct interpretation of results. If after two or three nights, the disturbed spots are concentrated in a single section of the line, the subsequent rate of robbery will be much less than if the disturbed spots are uniformly distributed. The reason is that a single mouse does not follow a seed spot line for any great distance, nor does it go outside its normal range. For example, whenever a section of a line passed through uninhabited areas, such as occur in virgin forests of Douglas-fir, seed in that section was not touched.

Follow-up trapping, in which traps were set at every seed spot after the rate of robbery had been determined, proved to be a useful means of comparing actual numbers of mice visiting the line with the number of spots that had been robbed. Generally, when the rate of robbery was high, follow-up trapping caught mice at regular intervals along the line. Conversely, when the rate was low, catches made by traps were clustered.

Follow-up trapping and the distribution of seed spot robberies indicated that mice often travelled

in loose groups of two or more individuals, and that a number of mice might attack one section of a line while leaving the remainder of it alone. As a result, there is no hard and fast correlation between the number of spots disturbed by mice and the number of animals that are likely to be taken along a line by trapping.

Conclusion

In spite of the many shortcomings which apply to the seed spot technique of censusing rodents, it is in the main a practical and reasonably reliable method of judging abundance or scarcity of small seed-eating mammals. The mistake that can be made in regard to its use is to expect too much from the method. For an accurate census of rodents it is less trust-worthy than trapping. It cannot, for example, indicate the number of animals that are likely to be captured by traps in a given area; but it can give a gross picture of population density. Invariably when the rate of seed spot robbery is zero after seeds have been planted for a few days, trapping will show an absence of mice; and, vice versa, if trapping reveals that mice are present, then at least some seed spots are sure to be robbed.

Insofar as foresters are concerned, the results of a rodent census conducted with seed spots are more informative than figures from a tapping census, for the number of seed spots robbed along a sample line indicates the rate at which seeds are likely to be destroyed if a large-scale planting operation is attempted. The actual number of animals present is relatively unimportant.

The method is particularly useful, too, in measuring the effectiveness of control operations designed to protect seed from mice. For example, in one area where the rate of robbery was 87 percent the first day and 100 percent by the end of the second, rodent poisoning caused a drop to zero on the first day and 1 percent on the second. Obviously control operations had been effective, and large-scale planting of seed could be undertaken with safety—until new animals invaded the area.

The time when rodents invade a poisoned area can be determined by inspecting a seed spot line every few days. If the line is rebaited, comparative results can be obtained for the same line in different months.

In control operations which involve the application of poison directly to the seed, as recommended by Spencer (8) and Kverno (5), animals which develop bait shyness will not rob seed spots. In that case, kernels of oats or wheat should be used in the test lines instead of coniferous seed to determine presence or absence of animals.

Moore (7) assumed that if the rate of robbery of one hundred or more seed spots was 5 percent or less at the end of the first night, "broadcast seeding of Douglas-fir may be done with safety." I believe that a more significant figure can be obtained after a seed spot line has been exposed to rodents for at least two weeks. Even when only 5 percent of the spots are robbed by the end of the first night, an alarming number may be disturbed within two weeks.

Summary

The seed-spot method of censusing rodents was found to be practical for judging presence or absence of small mammals, which, because of fondness for coniferous seed, are a threat to reforestation; but did not provide exact figures of population density.

The techniques as tested in the Douglas-fir region of California consisted in burying a few coniferous seed in each of one hundred spots, which were distributed along a line in groups of five. The distance between each group was thirty feet; between spots within a group, six feet.

The number of spots robbed of seed by rodents was considered the rate of seed spot robbery for the time involved and was expressed in percentage.

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A Cylindrical Screen for Protecting Direct Seedings of Forest Tree Species

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FOR APPROXIMATELY 45 years (*7*) several types of wire screen, usually of hardware cloth, have been used in the United States to protect direct seedings from rodent depredations. Most of the early tests of their effectiveness were conducted in the western mountain regions (*14*) where heavy concentrations of Columbia ground squirrels, mice, chipmunks, and pine squirrels were a serious obstacle to natural regeneration, particularly on large coniferous burns. The characteristic feature of these early seed-spot protectors was their conical design (*9*).

Various research workers have reported that screens of this type spelled the difference between success and failure in direct seedings of western white pine (*Pinus monticola* Dougl.), ponderosa pine (*P. ponderosa* Laws.), and other native conifers (*2, 4, 6, 11, 12*). A significant reduction in surface temperatures and light intensities under the wire cones also was observed in several instances (*3, 8*). There is a question, however, whether the combined cost of manufacturing, tranporting, setting, and lifting the screens may not limit their use to small-scale afforestation projects (*5*).

The most common type of screens used for experimental work in the Lake States also has been of conical shape. A typical unit measures 3.5 inches in height and 8.0 inches in diameter at the base, and is made from hardware cloth of 1/6- to ½-inch mesh. This is ideal for seedlings of conifers. It is not well adapted, however, for direct seedings of fast-growing hardwoods, such as northern red oak (*Quercus rubra* L.) because the constriction at the apex of the cone tends to deform both the stems and leaves and, in some cases, results in abnormal suppression by competing vegetation.

To eliminate these difficulties, a cylindrical screen has been devised. Other seed-spot protectors of this general design were either too small (*10*) or inadequately described (*13*) to serve as prototypes. Each unit is made from ½-inch-mesh galvanized hardware cloth, and is 6.9 inches in diameter and 8.0 inches high. One cylinder requires a rectangular sheet of material 24 inches long and 8 inches wide. All waste is eliminated by using 24-inch hardware cloth. The cylinder is secured by bending and clinching the projecting ends of the wire into the frame of the unit.

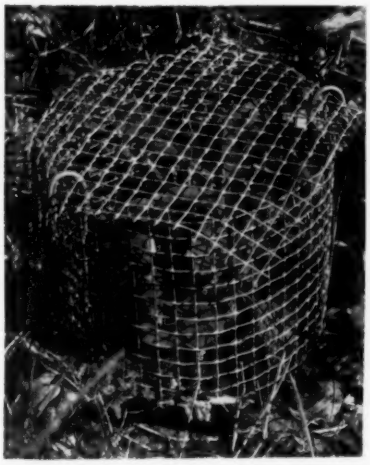

FIG. 1.—Cylindrical-type seed-spot screen with top held in place with wire pins. Note that the 1-0 northern red oak seedling in this protective cage has had ample room for the development of foliage.

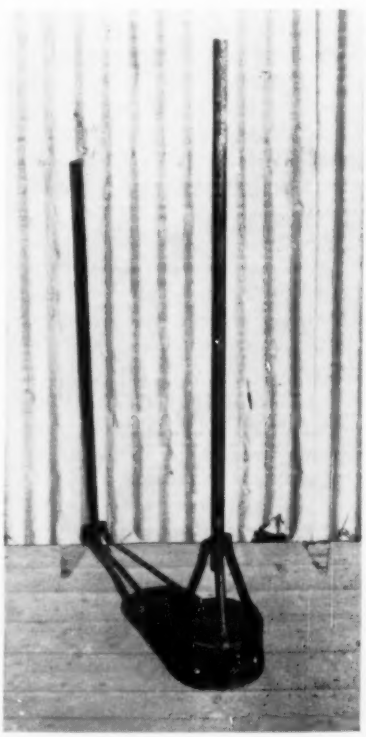

FIG. 2.—This special tool is used to cut a circular slit in the soil to facilitate setting the 8-inch cylindrical seed-spot screens.

An 8-inch square of hardware cloth is cut for a cap (Fig. 1). This is placed over the top of the cylinder and is secured with two or three 12-inch pegs of No. 10 galvanized wire, one end of which has been formed into a loop. These are thrust vertically through the cap (inside the cylinder) into the soil. The detachable cap can be removed very readily for an examination or count of the tree seedlings or for weeding operations without disturbing the well-seated cylinder. This particular feature would appear to be a distinct departure from the usual one-piece screens.

An alternative method of holding the cap in place is to bend down the projecting corners of the hardware cloth until they are flush with the cylinder. This is a desirable precaution after autumn seedings or following the last count of the year to provide over-winter protection in areas where frost heaving may loosen the pins and allow rodents clambering up the side to lift the cap and gain access to the seed.

The placement of the seed-spot screens in the field is facilitated by a special setting tool. This consists of a ¼-inch-thick steel cylinder, having an inside diameter of 6.9 inches and a total height of 3.5 inches, which is welded to a 48-inch length of ¾-inch pipe (Fig. 2). The bottom of the steel cylin-

[1]Stationed at Northern Lakes Forest Research Center, Rhinelander, Wisconsin.

FIG. 3.—A larger type of screen cylinder covering 2 square feet of area suitable for regeneration studies in birch, balsam fir, spruce, and other species.

der is sharpened to a beveled cutting edge of about 60 degrees. When in use the tool is plunged into the scalp or furrow bottom to a depth of about 2 inches, and the screen is forced into the depressed ring left in the ground. The soil on the outside is firmed with the heel to tighten the wire cylinder. About 400 spots can be seeded and protected per man-day, assuming that the scalps or furrows have been made previously.

Where large numbers of the screens are required, or where cargo space by vehicle or animal is limited, the precut 8- by 24-inch rectangles of hardware cloth can be left flat and assembled later at the planting site. If they are already made up, about 600 screens may be transported readily in a ½-ton pickup truck having cab-height side boards.

Wire cylinders of the type described here have given excellent protection against mice, chipmunks, and squirrels. This is shown by the results of experimental seedings made during the period of 1950 to 1952 on the Hardies Creek Timber Harvest Forest.[2] Not only was the average number of first-year northern red oak seedlings 43 percent greater on screened than on unprotected spots, but also the damage to these young trees from girdling was negligible, amounting to 0.4 percent; this was caused by a rodent that got under one of the 250 screens. Experience elsewhere (*1*) indicates that unprotected direct seedings of oak were damaged heavily by uncontrolled rodent populations.

Even when the covers are removed, the wire cylinders may serve a very useful purpose by protecting the young seedlings from rabbits. Thus on one experiment involving 100 screened versus 100 unprotected spots only one of 132 oak (0.8 percent) had been cut back by the end of the second growing season where the hardware-cloth cages, minus tops, were left in place as compared to a damage ratio of 7 out of 69 seedlings (10.1 percent) where the seedlings were given no protection.

A large cylinder was devised for studying natural reproduction of yellow birch (*Betula alleghaniensis* Britton) which may require protection for periods of from 3 to 5 years in certain types of experiments. This unit, covering 2 square feet of area, is 19.15 inches in diameter, 24 inches in height, and has a rectangular cap 20 by 24 inches. Both the cylinder and cap were cut from 24-inch hardware cloth.

The top is held in place by four pieces of copper wire. In weeding operations or counts, three of these wires are removed, and the fourth acts as a hinge on which to swing the cover.

In field installations, the cylinder is placed on disked or otherwise prepared soil, and its outline is traced on the ground with a stick. A shallow trench is made around this periphery with a spud, and the unit is set to a depth of 2 inches in the trench and then firmed on the outside with the feet.

The large cylinder also may be provided with a 6-inch-wide, thin galvanized metal sleeve around the outside of its upper part which acts as a barrier against small climbing rodents (Fig. 3). Dispensing with the caps permits normal litter accumulations inside the screen which may be a factor in over-winter losses of small seedlings by smothering. Actually, the 20- by 24-inch cover is not required except in areas of fairly deep snow which, when crusted, might give rodents access to the cylinder. In such instances, the top is wired in place after the leaf fall is completed.

[2]Located in Trempealeau County, Wisconsin. Owned by the State of Wisconsin and managed under cooperative agreement between the Wisconsin Conservation Department, the Lake States Forest Experiment Station, and the Extension Service.

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A Simplified Method for Estimating Form Class of Loblolly and Shortleaf Pine Stands in Mississippi[1]

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THE standard form class volume tables of Mesavage and Girard[3] are among the most accurate and widely applicable volume tables we have today. The main obstacle to their accurate use is the difficulty in ascertaining average stand form class as defined by James Girard[4]. If the form class of standing trees could be determined more readily, more attention would be paid to measuring the trees rather than estimating their form ocularly. This article presents a method suitable for loblolly and shortleaf pine in Mississippi and discusses a technique that may apply elsewhere as well.

Methods and Materials

The line connecting a point inside the bark at the small end of the 16-foot log to another point at d.b.h. outside bark is nearly tangent to the outer surface of the log for a short distance above and below the point of d.b.h. By making use of this relationship, it seemed logical that a pair of measurements taken within this zone of tangency would approximate the actual form class.

After considerable investigation with loblolly and shortleaf pine saw timber on several Mississippi sites, it was found that the d.i.b. at 7.0 feet above ground line divided by the d.o.b. at 2.25 feet above ground line resulted in a ratio that closely corresponded to the Girard form class of the tree. Expressed mathematically, Girard form class for these stands may be estimated by the equation,

$$\text{G. F. C.} = \frac{\text{d.i.b. at 7.00 ft.}}{\text{d.o.b. at 2.25 ft.}}$$

A difficulty in the preliminary work was that of establishing a basis for the rejection of abnormally formed stems. A linear regression was calculated for this purpose to determine the relationship of d.b.h. to diameter at 2.25 feet and of d.b.h. to diameter at 7.0 feet. These regressions are based on 214 trees whose form class estimated by the above method was within ± 3 numbers of the Girard form class. Both regression lines, Figures 1 and 2, are for diameters outside the bark.

This correlation permitted the calculation of Table 1, average di-

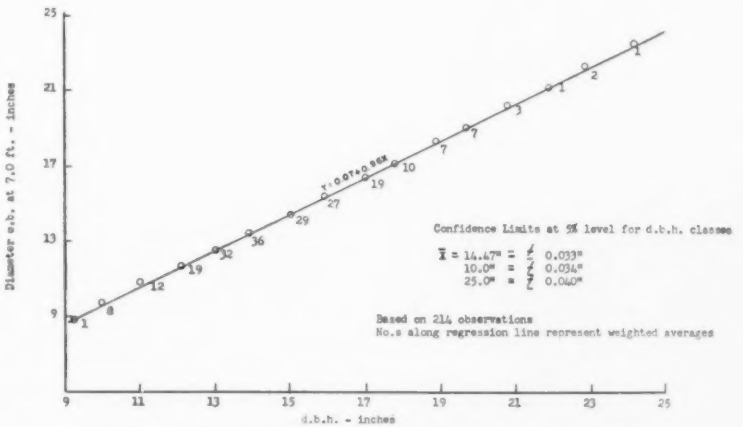
Diameter o.b. at 7.0 ft. - inches
d.b.h. - inches
Confidence Limits at 5% level for d.b.h. classes
Based on 214 observations
No.s along regression line represent weighted averages

FIG. 1.—Regression of diameter o.b. at 7.0 feet on d.b.h. o.b.

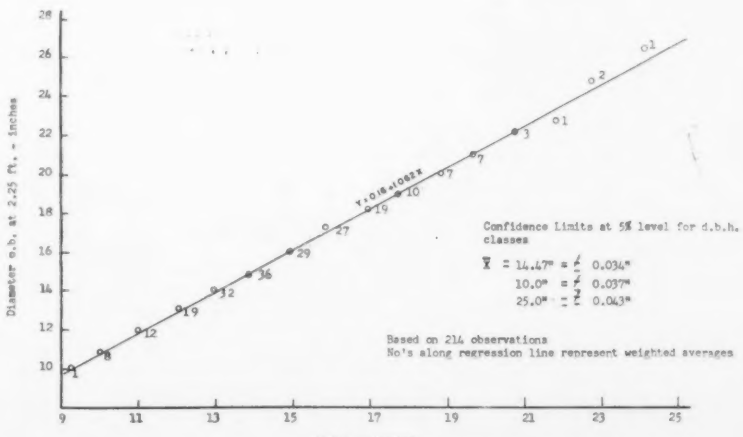
Diameter o.b. at 2.25 ft. - inches
d.b.h. - inches
Confidence Limits at 5% level for d.b.h. classes
Based on 214 observations
No's along regression line represent weighted averages

FIG. 2.—Regression of diameter o.b. at 2.25 feet on d.b.h. o.b.

[1]Published with the approval of the director, Mississippi Agricultural Experiment Station as Journal Article No. 501.

[2]The work reported here was conducted while the author was a member of the faculty of the Forestry Department, Mississippi State College.

[3]Mesavage, C., and J. W. Girard. Tables for estimating board foot volume of timber. U. S. Dept. Agric. Forest Serv.

[4]"Form class is the percentage ratio between the diameter inside bark at the top of the first 16-foot log and the diameter outside bark at breast height (4½ feet above the ground)." Op. Cit.

TABLE 1.—RELATIONSHIP OF DIAMETER AT 2.25 AND 7.0 FEET ABOVE GROUND LINE TO D.B.H.

D.b.h.	Dia.[1] 2.25	Dia.[1] 7.0
10.0	10.8	9.7
11.0	11.8	10.6
12.0	12.9	11.6
13.0	14.0	12.5
14.0	15.0	13.5
15.0	16.1	14.5
16.0	17.2	15.4
17.0	18.2	16.4
18.0	19.3	17.3
19.0	20.3	18.3
20.0	21.4	19.3
21.0	22.5	20.2
22.0	23.5	21.2
23.0	24.6	22.1
24.0	25.6	23.1
25.0	26.7	24.1

[1]The confidence limits for selecting an individual tree within a class are ±0.5 inches at the 5% level.

ameters at 7.0 and 2.25 feet for various d.b.h. classes. The confidence limits at the 5 percent level for predicting diameter at 7.0 and 2.25 feet of a tree with a known d.b.h. are ±0.5 inches. That is, one can expect a variation of ± 0.5 inches from the predicted values. Table 1 should be used as a guide to recognize abnormally formed trees. With its ±0.5 inch confidence limits, it gives diameter relationships indicative of normal trees for which the simplified form class is more apt to approximate the Girard form class. Differences in tree taper, causing differences in form class, are a function of variations in diameter at 7.0 and 2.25 feet within their confidence limits as well as differences in bark thickness at 7.0 feet among trees of the same d.b.h. class.

All measurements were made with a diameter tape and bark gauge graduated in twentieths of inches. The points of measurement on the lower part of the stem were established by using a 7.0 foot pole with marks at 4.5 and 2.25 feet. The bark was marked with a piece of lumber crayon at these three points and diameter measurements were taken. To obtain bark thickness at 7.0 feet the gauge was inserted upside down so that it could be read from below. Two bark measurements were taken and averaged. The top of the first 16 foot log was assumed to be 17.3 feet above the ground. This allowed for a constant 12 inch stump height.

TABLE 2.—COMPARISON OF ACTUAL AND ESTIMATED FORM CLASSES FOR LOBLOLLY AND SHORTLEAF PINE STANDS IN MISSISSIPPI[1]

Stand No.	Stand location	Actual stand form class	Estimated stand form class
1	Oktibbeha Co.	81	79
2	Oktibbeha Co.	80	79
3	Oktibbeha Co.	81	81
4	Oktibbeha Co.	81	79
5	Oktibbeha Co.	80	80
6	Oktibbeha Co.	79	79
7	Oktibbeha Co.	80	80
8	Winston Co.	82	81
9	Winston Co.	82	81
10	Winston Co.	77	79
11	Lafayette Co.	84	84
12	Newton Co.	78	80
13	Newton Co.	85	85

[1]Actual and estimated form class for each stand is an arithmetic average of 20 observations.

TABLE 3.—COMPARISON OF ACTUAL TO ESTIMATED FORM CLASS (Newton County)

Tree No.	D.b.h.	Actual form class	Estimated form class
1	15.0	84	83
2	18.1	81	86
3	19.7	84	84
4	18.8	84	86
5	17.1	87	85
6	19.5	86	85
7	19.0	87	88
8	19.1	81	88
9	14.0	86	87
10	13.6	86	88
11	19.4	85	80
12	14.8	80	82
13	19.2	88	86
14	13.2	87	86
15	15.2	83	83
16	16.6	89	87
17	16.9	87	84
18	17.2	83	84
19	13.4	83	83
20	19.6	85	80
Total		1,696	1,695
Ave.		84.80	84.75
		85	85

TABLE 4.—COMPARISON OF ACTUAL TO ESTIMATED FORM CLASS (Noxubee Wildlife Refuge, Winston County)

Tree No.	D.b.h.	Actual form class	Estimated form class
1	25.7	84	83
2	19.5	81	79
3	22.4	82	83
4	17.5	84	81
5	16.9	82	83
6	19.0	84	79
7	14.9	79	80
8	15.1	83	80
9	16.2	77	77
10	17.8	83	82
11	17.9	84	84
12	17.1	85	83
13	20.9	85	85
14	17.3	81	82
15	17.4	82	82
16	18.8	82	83
17	21.4	84	81
18	14.9	79	79
19	19.0	79	76
20	16.4	80	78
Total		1,640	1,620
Ave.		82.0	81.0

Results and Conclusions

This method was tested in thirteen loblolly and shortleaf pine stands on groups of twenty trees over a two hundred mile range in Mississippi. On this basis the average of the estimated form class was always within ± 2 form class numbers of the actual average stand form class (see Table 2). Average stand form class varied from 77 to 85. Tables 3, 4, and 5 are representative of the stands measured. Table 6, an analysis of variance shows no significant difference between actual and estimated form classes. The correlation coefficient for this group of thirteen samples was 0.83 which was highly significant. In most cases the estimated form class for an individual tree varied within ± 1 of the actual form class 40 percent of the time. The remaining trees were equally over- and under-estimated sometimes by as much as 7 form class numbers. For this reason, it was thought that the method would not be reliable on an individual tree basis.

This method is limited to saw timber stands of average density. It will not work on very open grown old field stands. Here the top of the first 16 foot log is within the live crown and the branches have reduced this top diameter far

below normal. This type of tree can have a form class of 50 or lower. The form class of pulpwood stands are also overestimated because the upper portion of the stem tapers relatively faster than the lower section. Here the relationship is somewhat more uniform and further investigation may prove the method workable when reduced by an appropriate constant.

Where an error in the estimation of average stand form class of ± 2 form class numbers is not considered excessive, this method is adequate.

To apply this method to other species, the following general procedure might be used. Using a ladder or climbing irons, measure Girard form class on a group of about twenty trees in a stand. On the same trees, measure diameter o.b. and bark thickness at 0.25 foot intervals between 5.5 and 7.0 feet above ground line and diameters o.b. at 0.25 foot intervals between 1.5 and 3.0 feet above ground line. Calculate the ratios obtained in this manner and compare them to the conventional form class. Using the ratios that most closely approximate actual form class, obtain measurements in other stands until enough trees (100-200) are measured so that a strong regression line of d.b.h. to diameters o.b. above and below d.b.h. may be drawn. These two regression lines and their confidence limits will describe the normal trees in each d.b.h. class that should be chosen for subsequent measuring when applying this simplified technique.

Summary

Average stand form class of loblolly and shortleaf pine saw timber in Mississippi can be measured by the ratio of the d.i.b. at 7.0 feet above ground divided by the d.o.b. at 2.25 feet above ground on groups of twenty trees or more. On this basis the estimated average form class will be within ± 2 form class numbers of the actual average form class. This method is limited to saw timber sized stands of average or better density.

TABLE 5.—COMPARISON OF ACTUAL TO ESTIMATED FORM CLASS (Northeast Mississippi Experimental Forest, Oktibbeha County)

Tree No.	D.b.h.	Actual form class	Estimated form class
1	14.4	87	81
2	17.2	81	80
3	12.7	85	81
4	17.7	80	80
5	13.3	81	78
6	13.2	82	81
7	13.0	86	80
8	15.9	80	78
9	14.5	81	79
10	11.4	76	76
11	15.6	83	80
12	14.1	76	77
13	15.1	74	80
14	16.3	78	79
15	13.8	83	79
16	12.3	80	77
17	13.3	80	76
18	17.1	82	79
19	12.6	81	80
20	11.5	80	77
Total		1,616	1,578
Ave.		80.8	78.9
		81	79

TABLE 6.—ANALYSIS OF VARIANCE OF ACTUAL AND ESTIMATED FORM CLASS

Source	d.f.	S.S.	M.S.	F
Treatments	1	0.34	0.34	0.0045[n.s.]
Pairs	12	94.39	7.87	10.35**
Error	12	9.15	0.76	
Total	25	103.88		

[n.s.] Not significant
** Highly significant
Correlation coefficient $r = 0.83$

Coming Events

Wildlife Conference

The 21st North American Wildlife Conference will be held March 5-7 in the Jung Hotel, New Orleans, La.

Surveying and Photogrammetry Meetings Consecutive

The 16th annual meeting of the American Congress on Surveying and Mapping will be held March 18-21 at the Shoreham Hotel, Washington, D. C. It will be followed March 21-24 by the 22nd annual meeting of the American Society of Photogrammetry.

Southern Forest Fire and Woods Arson Conference

Sponsored by national and southern forestry and industrial groups, the Southern Forest Fire and Woods Arson Conference will be held April 12-14 in the Roosevelt Hotel, New Orleans, La.

Upper Mississippi Valley Section

The spring meeting will be held at Grand Rapids, Minn., April 5-6. Subject: "Bringing up-to-date the S.A.F. Forestry Program for Minnesota." The summer meeting is scheduled for August 17-18 at Bottineau, N. Dak.

Results of Several Methods of Release of Understory Loblolly Pine in Upland Hardwood Stands[1]

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IN MANY upland areas of the Piedmont, cull hardwoods and brush dominate extensive understory stands of spindly seedlings and saplings of loblolly pine (*Pinus taeda* L.) Frequently, in such stands, enough understory pines are present to form satisfactory stocking if release from hardwood competition is achieved; or lacking this, often enough thrifty loblolly seed trees are present to seed in openings after hardwoods are removed.

A study was undertaken on the Hope Valley Forest of the North Carolina State College School of Forestry, in Chatham County, North Carolina, in the spring of 1952, to determine the costs and effects of several degrees or kinds of release of understory loblolly pine dominated by upland hardwoods of relatively low value. Ten one-acre plots were laid out, comprising two replications of five plots or treatments each.

White oaks (*Quercus alba* L., *Q. lyrata* Walt., and *Q. stellata* Wangenh.) and red oaks (*Q. velutina* Lam., *Q. falcata* Michx., *Q. marilandica* Muenchh., and *Q. nigra* L.) predominated in the overstory. Their diameters ranged from four to twenty inches, with the major portion in the four-to-eight-inch classes. Sweetgum (*Liquidambar styraciflua* L.), blackgum (*Nyssa sylvatica* Marsh.), hickories (*Carya* Nutt.), dogwood (*Cornus florida* L.), and red maple (*Acer rubrum* L.) were also represented. The total number of hardwood stems merchantable for fuel ranged from 93 to 194 per acre. Shortleaf pine (*Pinus echinata* Mill.) made up 8.3 percent of the pines measured for growth. Calculations show that this species did not introduce any discrepancies in growth rate which would affect the validity of the conclusions drawn from the study.

A tally of pines under 35 feet in height showed a range of 1,040 to 2,590 pine stems per acre on the various plots, adequate numbers to justify release. A study of the growth and age of 158 suppressed pines showed that pines ranging from two to fifteen years old were putting on only about one-third foot of height growth per year, the regression equation being $Y = 0.337X - 0.420$, where Y represents average tree height in feet and X represents tree age in years. The correlation coefficient, 0.9726, indicates a high degree of correlation between height and age.

Site index, determined according to the method developed by Coile[3], ranged from 78.0 to 85.5 feet. The soil types identified in this determination were Granville fine sandy loam, Granville fine sandy clay loam, White Store fine sandy loam, White Store fine sandy clay loam, Creedmoor fine sandy loam, Mayodan fine sandy loam, and Worsham sandy loam.[4]

The treatments were as follows:

CN—Control.

CH—Merchantable hardwood fuelwood cut.

CHB—Same as CH plus cutting of all brush and hardwoods below 3.6 inches d. b. h.

AH—Poison all hardwoods 3.6 inches and larger with Ammate in notches at base of tree. A heaping tablespoonful of powder was applied to each notch.

AHB—Same as AH plus cutting of all brush and hardwoods below 3.6 inches.

The cost of felling hardwoods proved to be four to five times as great as that of poisoning them with Ammate. The total cost of felling, bucking into eight-foot bolts, and hauling the 17.3 cords of usable material about one-half mile to the wood yard was approximately $108 per acre. A part or all of this cost can be recovered, however, if a fuelwood or a suitable pulpwood market is available. It was noted that the felling of hardwoods caused considerable damage to pine reproduction; such damage might prove excessive where only a limited pine understory is present.

Ammate was very effective, causing complete kill on over 80 percent of the treated stems in the first five months. Application of the salt during dry, hot weather in late May and early June caused serious effects on some trees within two days.

Measurements of light intensity, soil moisture, and soil temperature taken after the treatments gave higher values on the treated than on the untreated plots in all three factors.

Heights were measured to the nearest one-tenth foot. Diameters were read to the nearest one-hundredth centimeter with a pair of vernier calipers designed for the purpose, and then converted to inches. While each plot was one acre in total area treated, the measurements were confined to a tenth-acre in the center of the plot. All pines were measured, but only those less than nine feet in height at the time of plot establishment are included in this analysis, since taller trees were not uniformly represented on the various plots.

The second measurement was made in November, 1952, five months after the pines were released. This showed that survival

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[1]Contribution from the School of Forestry, North Carolina Agricultural Experiment Station, Raleigh, N. C. Published with the approval of the Director of Research as Paper No. 659 of the Journal Series.

[2]The authors are grateful to Dr. T. E. Maki, School of Forestry, North Carolina State College, for generous counsel and assistance in this study.

[3]Coile, T. S. Relation of soil characteristics to site index of loblolly and shortleaf pines in the lower Piedmont region of North Carolina. Bul. 13, Duke University School of Forestry. 1948.

[4]The soil types were identified by Prof. W. D. Lee, Department of Agronomy, North Carolina State College.

of pine was satisfactory, that height growth had not been significantly affected in the short time since release, and that seedlings three to nine feet high showed more increase in diameter growth than did those less than three feet high.

A third measurement was made in April, 1954, not quite two growing seasons after release. Survival was still satisfactory, being 80.4 percent on check plots and 94.8 percent on treated plots. The growth data are given in Tables 1 and 2.

The pines on treated plots put on twice as much height growth, and more than four times as much diameter growth, as those on the check plots.

Replication II, it will be noted, is poorer than Replication I in both height and diameter growth A partial explanation for this difference may be provided by the fact that Replication I averaged 1,428 pines below 35 feet in height per acre, while Replication II averaged 1,884 pines per acre.

Analysis of variance, with five treatments, three three-foot height classes, and two replications, showed a highly significant difference in growth response of the height classes, with most of the response occurring in the three-to six and six-to-nine foot classes. It also indicated that 74 percent of the sum of squares for treatment effects on height growth, and 91.6 percent of treatment effects on diameter growth, were attributable to the comparison of control plots versus all other treatments. There was no indication of important difference between the four actual release treatments.

Regression equations, however, computed for height growth over original height for each of the five treatments, not only confirmed the superiority of release treatments over controls, but also brought out the effects of damage by felling on the cutting plots.

The equations for estimated height growth ($\hat{Y}$), assuming linear relationship within the range of the data, when expressed in the form $\hat{Y} = a + bX$, where a is the ordinate of the point at which the line crosses the Y axis (Y intercept), b is the regression coefficient, representing the slope of the line, and X is the total height at time of plot establishment, are as follows:

(CN) $\hat{Y} = .197 + .0460X$ $t = 6.86^{**}$

(AHB) $\hat{Y} = .410 + .0918X$ $t = 6.70^{**}$

(AH) $\hat{Y} = .579 + .0725X$ $t = 4.74^{**}$

(CHB) $\hat{Y} = .461 + .0368X$ $t = 2.63^{**}$

(CH) $\hat{Y} = .823 - .0121X$ $t = 0.56$

The t-values for the regression coefficients are all significant at the one percent level with the exception of that for CH, which failed to attain significance at the five percent level. This failure is probably caused by the fact that the presence of damaged and undamaged trees increases the variability of the material.

The regression coefficients for AHB and AH are much larger than that for the control, causing more steeply rising lines. The coefficients for CHB and CH are both smaller than that for the control. This reflects the damage caused to young pines in the process of felling the hardwoods. Within the nine-foot range of heights included in the data, greater felling damage would be expected in the taller height classes. This damage would tend to reduce the upward slope of the line of height growth, or even to give it a slightly negative direction, as apparent in the case of CH.

The relative positions of the lines suggest that cutting might result in the greater net growth, were it not for the damage caused in felling.

This study indicates that the response of height and diameter growth to release of seedlings and saplings is rapid, and that the choice of methods of release will depend on the circumstances. Growth responses are approximately the same following treatment with Ammate or felling, but the former is cheaper and does not result in damage to the young pines. The removal of brush apparently has little effect on growth.

Conclusions

In two growing seasons after the release of understory loblolly pine from upland hardwoods by felling and by poisoning with Ammate:

1. Height growth of pines up to nine feet tall at time of treatment was doubled as a result of treatment.

2. Growth in diameter breast high was quadrupled.

3. The different treatments showed little variation in their effects on growth, but felling caused more damage to young pines than did treatment with Ammate. Felling was also much more expensive than Ammate treatment, but the cost of felling may be recovered if a market for fuelwood or pulpwood is available.

TABLE 1.—PERIODIC GROWTH IN HEIGHT (JUNE, 1952-APRIL, 1954)

Replications	Treatments					Mean of all release treatments
	CN	CH	CHB	AH	AHB	
	Feet					
I	0.4	1.3	0.7	1.0	1.1	1.0
II	0.4	0.4	0.6	0.6	0.7	0.6
Mean	0.4	0.8	0.6	0.8	0.8	0.8

TABLE 2.—PERIODIC GROWTH IN DIAMETER BREAST HIGH (JUNE, 1952-APRIL, 1954)

Replications	Treatments					Mean of all release treatments
	CN	CH	CHB	AH	AHB	
	Inches					
I	0.11	0.79	0.37	0.45	0.55	0.53
II	0.08	0.19	0.46	0.31	0.27	0.28
Mean	0.09	0.32	0.42	0.39	0.39	0.38

Notes

Genetically Similar Seedlings for Physiology Experiments

In the measurement of physiological reactions to environmental treatment, uniformity in response among plants treated alike is as important as precise control of the treatment. In greenhouse or other experimental work involving potted or planted trees, however, not only the handling but also the source of the plant material is often given too little thought.

For example, in an experiment on the relation of soil aeration to growth, an investigator might employ elaborate equipment and techniques in a well planned design, then carefully measure certain responses of treated and untreated seedlings. But where are the seedlings obtained?

If the species is commercially important, they probably are transplanted from a large state or industrial nursery. Seedlings from such a source are likely to respond nonuniformly to a uniform test environment, not only because of varying micro-environments in the nursery and varying degrees of injury from lifting and planting, but also because of diverse ancestry. Heterogeneous ancestry might influence experimental results most seriously if there were unbalanced proportions of seedlings from two or more races differing greatly in their physiological responses.

The investigator might eliminate environmental variation by growing his trees from seed in the pots in which treatments are to be applied. But if he used seed of unknown heritage, his trees might still be subject to excessive or unrepresentative genetic variation.

With the current development of forest genetics and its techniques for controlled pollination, there seems little excuse for not using known "brothers" in experimental work with seedlings. The effort of producing controlled seed should be worth while in most studies in which the need can be anticipated sufficiently in advance. The uniformity of response obtainable by using such seed is particularly desirable when capacity and cost of apparatus limit an experiment to small numbers of trees.

It may be desirable to introduce a genetic variation into the experimental design, but still under control. Such a design would be necessary in studying the interactions between physiological treatments and different genotypes, or to permit extension of conclusions from only a few trees to part or all of a species. For example, treatments can be applied to equal numbers of seedlings of two or more races that are known, or suspected, to differ in their physiological responses. Or, for an estimate of broad physiological variations in seedlings of the same species over a general region, seed may be obtained by sampling each recognized race separately, with appropriately weighted calculations of mean and variance. Either approach is superior to the use of seedlings of unknown origin.

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A Bird Repellent for Direct Seeding of Longleaf Pine

A recent article[1] summarized the results of direct-seeding trials with longleaf pine in Louisiana and Mississippi during 1948-52. It noted that birds are the greatest obstacle to success and that patrolling for birds, though helpful, was expensive and not completely effective. In this area the most destructive birds in fall seeding are meadowlark (*Sturnella magna*); savannah sparrow (*Passerculus sandwichensis*), and vesper sparrow (*Pooecetes gramineus*).

During the past two years, field tests by the Alexandria Research Center of the Southern Forest Experiment Station have revealed that several of the anthraquinone compounds are effective bird repellents. (Anthraquinone is used primarily in the manufacture of laxatives, photographic materials, and dyes.)

In 1953, trials on small plots near Alexandria, Louisiana, showed that seed coated with Morkit, a commercial bird repellent containing anthraquinone, yielded 4,500 seedlings per acre. Untreated seed produced 195 seedlings per acre. Seed treated with sublimed synthetic anthraquinone produced 3,778 seedlings per acre and untreated seed 1,778.

Tests in 1954 strengthened these indications. Morkit-coated seed yielded 3,050 seedlings per acre, seed coated with Quinizarine (another commercial anthraquinone compound) 2,970, and untreated seed 250.

In 1954 also, a 200-acre trial was undertaken in which only Morkit-treated seed was used. The initial stand averaged 3,250 seedlings per acre, despite a heavy population of seed-eating birds and dry weather that extended the germination period. Regular examinations of specially seeded plots revealed no losses to birds before the seed germinated, and these observations were confirmed by detailed stomach examinations of birds prevalent on the area.

In both years, sowing was at the rate of 3 pounds of cleaned seed per acre. No bird patrols were conducted.

[1] Derr, H. J. and F. M. Cossitt. Longleaf pine direct seeding. Jour. Forestry 53:243-246. 1955.

The recommended procedure for treating longleaf seed is to dip cleaned seed in a sticker made of asphalt emulsion in water (25 percent concentration by volume), let the excess emulsion drain off, and then tumble the seed in a steel drum containing Morkit, which is a dull gray powder. About one-quarter pound of Morkit will adhere to one pound of seed. Total labor and materials for this treatment has averaged about $0.15 per pound of seed.

The Denver Wildlife Research Laboratory, of the U. S. Fish and Wildlife Service, recommended the asphalt sticker and assisted the Alexandria Research Center in several bird-repellent tests. In order to expand the cooperative bird-depredation studies, the Fish and Wildlife Service recently stationed an ornithologist at Alexandria. Until a cheaper repellent is found, however, the anthraquinone compounds mentioned above are recommended for direct-seeding longleaf pine.

Morkit has not been effective in preventing rodent or rabbit depredations (although rodents have not proved numerous in the fall). Consequently, safeguards against predators other than birds must be maintained.

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Eliminating Understory Hardwoods with Summer Prescribed Fires in Coastal Plain Loblolly Pine Stands

The loblolly pine type of the South Carolina Coastal Plain flatwoods is characterized by an understory in which southern waxmyrtle or bayberry (*Myrica cerifera* L.) and sweetgum (*Liquidambar styraciflua* L.) predominate. The proportion of each varies considerably by location. Nevertheless, understories of 8 or 10 thousand stems per acre of one or both species are common. In these areas the establishment of pine after logging requires an effective brush-control program. To this end prescribed burning is a very useful tool.

Results from numerous prescribed fires on the Santee Experimental Forest[1] show that bayberry is more susceptible to control than any of the important shrubs or hardwoods. Winter or dormant-season fires kill bayberry stems of almost any size. The difficulty is that few hardwoods, such as sweetgum, above 1 inch d.b.h. are killed back; and regardless of size, all hardwoods and shrubs affected by winter burning will generally resprout. Much better results are possible by means of prescribed fires during the summer season. A short series of annual summer fires will practically eradicate both bayberry and sweetgum from a loblolly pine understory (Fig. 1).

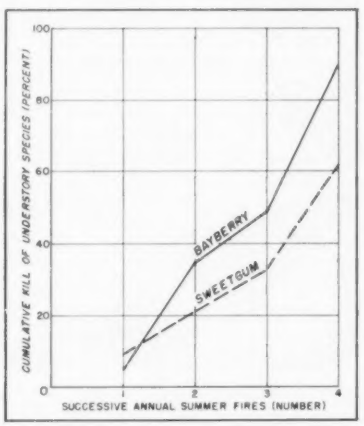

FIG. 1.—Cumulative mortality of understory bayberry and sweetgum in a 40- to 50-year-old stand of loblolly pine prescribe burned with successive annual summer fires.

The illustrated results were derived from a series of five ¼-acre plots in stands of 40- to 50-year-old loblolly pine. Three are at the Santee Experimental Forest and two at the Westvaco Experimental Forest.[2] Each plot contains five circular 1/100-acre randomized subplots in which five stems of each species were selected for study. Survival counts were made approximately one year after each of four annual fires. An earlier report[3] gave results of the first three annual fires.

Although 90 and 60 percent respectively of the bayberry and sweetgum were killed with four annual fires, acceptable results were obtained with fewer fires. As early as the second burn, substantial numbers of both species were dead. At the same time, surviving stems were considered of such low vigor as to afford little competition for years to come.

Mortality among other hardwoods followed a similar trend but was not as high. Blackgum (*Nyssa sylvatica* M.) suffered a kill of about 40 percent over the 4-year burning period. Miscellaneous oaks as a group were reduced 20 percent.

Summer prescribed burning has been studied for 9 years at the Santee Experimental Forest. Other plot experiments include a series with nine successive annual fires. Additional tests involve 40- to 50-acre tracts of loblolly pine as part of a regular program of management (Fig. 2). Experience with these summer fires has emphasized the importance of suitable weather and fuel conditions.

Favorable weather elements are: air temperature, 90° or more; relative humidity under 50 percent; wind, steady, 1-3 miles per hour; and at least several days since ½-inch or more of rain. Fuel moisture determined with sticks usually ranges from 3 to 5 percent. Most burning is done after midday.

Fuels composed principally of

[1]Operated by the Southeastern Forest Experiment Station on the Francis Marion National Forest near Moncks Corner, S. C.

[2]The Westvaco Experimental Forest is operated by the West Virginia Pulp and Paper Company near Georgetown, S. C.

[3]Lotti, Thomas. Summer fires kill understory hardwoods. Southeastern Forest Experiment Station Research Note 71. January, 1955.

dead hardwood leaves (flat fuels) are most difficult and consequently safest to burn. Those containing a high proportion of pine needles are most inflammable. In these latter fuels, caution is needed in heavy accumulations. The heat generated from a summer fire in such fuels may damage the pine stand. A dormant-season fire is easier to control and the chance of damage is small under ordinary burning conditions. Consequently, the heavier roughs may be reduced by means of a winter fire a year or two in advance of a series of summer burns.

Whenever possible, the prescribed fires are set to burn against the wind (backfire). This makes control easier. Thin fuels resulting from the repeated fires, or some of the flat fuels, may require burning with the wind (head or flank fire) to make a fire spread. However, a hot, fast-running fire is unnecessary inasmuch as 1- or 2-year sprouts succumb easily to a light summer fire. No damage to the loblolly pine stand on upland sites results from a properly handled summer fire.

Experience in prescribed burning during the dormant season is desirable before doing any summer burning. Initial efforts should be confined to small plots or blocks; as experience is gained, larger tracts may be attempted. Crown scorch is evidence of faulty technique and can be avoided in a carefully planned, conservative burning program.

For the interim stages of stand management, periodic winter burning is still the best method to keep the hardwoods small even though not reduced in number. For stands approaching harvest, successive annual summer fires are a more drastic treatment to reduce hardwoods in number as well as size. Annual summer burning could well begin several years in advance of harvest for the dual purpose of preparing the seedbed and reducing the hardwood population.

FIG. 2.—*A*, Stand of loblolly pine saw timber on the Santee Experimental Forest. *B*, Same area 6 years later, after two improvement cuts and four prescribed fires (one winter fire to reduce fuel followed by three annual summer fires).

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Insect Problems in Forest-Tree Genetics

Insects attacking the cones and flowering parts of pine have always been a problem to the forester and pine nurseryman, notably so during years of low seed production. With the advent of pine genetics work in the South, these losses have become of greater consequence because of the high cost and, more important, the time element involved in obtaining the desired crosses.

Perhaps the most troublesome insects have been those attacking first-year cones, especially on longleaf pine trees (*Pinus palustris* Mill.). However, tests at the Southern Institute of Forest Genetics, Gulfport, Mississippi, have shown that losses can be reduced by sprays of benezene hexachloride (BHC). In 1954, 0.25-percent wettable BHC or 0.5-percent emulsifiable BHC was applied with a hydraulic sprayer in April, June, August, and October. Sprayed longleaf pines lost only 26 percent of their first-year cones, as compared to a 68-percent loss on unsprayed trees.

Most of the loss was due to insects attacking the cone directly. The damage was attributed mainly to a small beetle, *Ernobius granulatus* LeConte, which emerged from dead cones collected in June and August from unsprayed trees. A pitch moth (possibly *Dioryctria amatella* Hulst) also caused some damage. Larvae of this moth attack the cone directly and also bore down the pith of the new shoots, thereby killing the twig tips and, incidentally, the new cones.

The tests were continued in 1955, but the first spray was applied in March, immediately following removal of the pollinating bags. Slash pine (*Pinus elliottii* Engelm.), as well as longleaf pine, was included in the trials. The insecticide was 0.5-percent BHC in water emulsion. Effectiveness of the treatments was greatly decreased by a heavy freeze during late March following unseasonably warm weather. Slash pine conelets proved more resistant to freezing than did longleaf. Accordingly, the insecticide treatments on slash were of significantly greater effectiveness than on longleaf. Mortality caused by insects and freezing was 53 percent on sprayed first-year slash pine cones and 77 percent on unsprayed check trees. Losses for longleaf pine were 88 percent for sprayed trees and 95 percent for check trees. The trees will be treated again during 1956 in an effort to reduce loss of second-year cones.

Besides the cone insects, several others have been encountered in various genetics projects. An insect identified as *Pomphopoea polita* (Say), one of the blister beetles, consumed all the pollen catkins on a selected shortleaf pine (*Pinus echinata* Mill.) parent in south Mississippi.

A bark weevil, *Pissodes nemorensis* Germ., killed about 250 Sonderegger pine *P.* × *sondereggeri* H. H. Chapm.) seedlings in a heel-in bed. These seedlings were to be used as grafting root stock. Sixty additional seedlings had been potted and placed in the lath house; only 1 of the 60 survived.

A bark beetle, *Pityopthorous pulicarius* (Zimm.), reported attacking pine grafts in Florida by Smith and Mergen,[1] also attacked grafts in south Mississippi. A preventive spray of 0.25-percent BHC in water emulsion immediately following grafting apparently gave good control.

Test seedlings on the state forest at Woodworth, La., and also on the McNeill Experimental Forest in south Mississippi, were found heavily attacked by adults of the pales weevil, *Hylobius pales* (Hbst.). Further damage was prevented by spraying the seedlings with either emulsifiable or wettable BHC at a 0.25-percent concentration.

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[1]Smith, R. H., and F. Mergen. A bark beetle attacking scions of grafted slash pines. Jour. Forestry 52: 864-865. 1954.

Integrating Light Meter Developed in Canada

A light meter that will aid biologists to measure the amount of light received by trees and plants has been developed by the National Research Council of Canada and the Forestry Branch, Department of Northern Affairs and National Resources.

The integrating light meter was designed to measure and record the total amount of light coming from all directions as contrasted to the pyrheliometer used by meteorologists and the exposure meter of photographers which recorded the amount of light received by flat surfaces only.

To record the light coming from all directions, a glass sphere four inches in diameter is used in the meter. Light striking the globe passes to a photoelectric cell causing an electric current to operate a counter.

Because plants respond mainly to the light wave lengths lying in the visible part of the spectrum, the integrating light meter is sensitive to those wave lengths only. Following tests, forest biologists describe the meter as a "useful and flexible instrument" for a wide range of experiments on the effect of light on tree growth.

Points of View

Comments on "Some Treatment Effects on Loblolly and Shortleaf Pine Reproduction"

In his recent paper on loblolly and shortleaf pine reproduction,[1] Professor Meyer was commendably cautious in restricting his conclusions to "a specific area . . . in southeastern Arkansas." However, a comparison of his results with observations made in the Bigwoods Experimental Forest[2] in northeastern North Carolina suggests a close similarity in the requirements for the natural regeneration of loblolly pine at opposite ends of its range.

Seed requirements for reproduction in North Carolina were reported in terms of the number of sound seeds needed to establish one additional seedling at the end of each succeeding growing season following logging or seedbed preparation.[3] The use of seeds/seedling ratios indicates the same trend found in Arkansas, that the seed supply is of primary importance in the establishment of reproduction—the more seed supplied, the more seedlings established. The ratios show also that about one-third fewer seeds are needed to establish a given number of seedlings in burned than in unburned tracts, a difference of about the same magnitude shown by Professor Meyer's data.

He also observed the importance of fresh seedbed conditions in obtaining prompt regeneration, a point that was emphasized in the report of the Bigwoods observations. In fact, the two sets of findings can be closely reconciled. The Bigwoods seeds/seedling ratios were based on the seedlings present at the end of each growing season, which correspond to Professor Meyer's "1 year +" seedlings. In his Block I, establishment was poor in the first year after the harvest cut because of a shortage of seed. In the second year an excellent seed crop was produced and the number of established seedlings (1 yr+) increased substantially. Since Block II was cut a year later than Block I, the heavy seed crop fell on a fresh seedbed in Block II and on a 1-year-old seedbed in Block I. Assuming that the seed supply was about the same in both blocks, the difference in the number of seedlings established in the following growing season reflects the difference in seedbed conditions. On the average of all cuttings, 4.4 times as many seedlings were established by the same amount of seed on the fresh seedbed as on the 1-year-old seedbed. The comparable figure for the Bigwoods is 3.6. During the next 4 years in Block I, the number of established seedlings increased in some cuttings and decreased in others, the overall average showing a slight, unimportant decrease. In Block II, heavily stocked initially, the number of established seedlings decreased during the following years. Since the number of established seedlings did not increase after the second year in Block I, where there was room for more seedlings, conditions for seedling establishment evidently had reverted to an undisturbed state by the third year after logging or burning. In the Bigwoods, the seeds/seedling ratios for the third year and later on initially favorable seedbeds were of the same magnitude as the ratio for an undisturbed seedbed. The favorable seedbed conditions created by logging or burning thus disappear in Arkansas at the same rate as they do in North Carolina.

However, as Professor Meyer pointed out, the seedling stand is not described so well by the number of seedlings as it is by a stocking percentage from a stocked-quadrat survey. On the basis of the stocking percentages he observed, he placed some emphasis on an improvement over the years where initial stocking was poor, "dependent upon the heaviness of the residual stand and the fullness of the seedfall." But his data show that the improvement occurred mainly in the second year in Block I, when the seed crop was heavy and the favorable post-logging seedbed had not yet disappeared completely. Changes in subsequent years were not consistently upward and were, on the whole, rather small. Consequently, it is unlikely that stocking would have been substantially increased if the seed crop had not been heavy in the second year. Since we will not often be lucky enough to catch a heavy seed year to rescue a first-year reproduction failure, a build-up cannot be depended upon to produce satisfactory stocking. Some increase in seedling numbers and stocking percentages over a period of years after harvest cutting has also been observed in the Bigwoods, but of six tracts cut in the poor seed years of 1948 and 1949 only two, which had been disked before logging, have attained satisfactory stocking without later seedbed rehabilitation. In these cases the second year was a poor or mediocre seed year and in the third year the seed trees produced abundant seed because of being released by the harvest cut-

[1] Meyer, Walter H. Some treatment effects on loblolly and shortleaf pine reproduction. Jour. Forestry 53: 895-900. 1955.

[2] Maintained in Hertford County, N. C., by the U. S. Forest Service in cooperation with the Camp Manufacturing Company, Inc., Franklin, Virginia.

[3] Trousdell, K. B. Favorable seedbed conditions for loblolly pine disappear 3 years after logging. Jour. Forestry 52: 174-176. 1954.

ting. Other cases where no satisfactory improvement occurred exist in the Bigwoods and in other localities.[4] Consistent success in regenerating loblolly pine stands by natural seeding depends, therefore, on making provision for a plentiful supply of seed in the first year after harvest cutting or seedbed preparation.

Except for the difference of opinion regarding the improvement in stocking in later years, Professor Meyer's findings parallel those from the Bigwoods in striking fashion and indicate that the requirements for the natural regeneration of loblolly pine are essentially the same in Arkansas and in North Carolina. Professor Meyer's report is a substantial contribution to the status of knowledge of loblolly pine.

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[4]McClay, T. A. Growth, mortality, and regeneration after cutting in loblolly pine pulpwood stands. Southeastern Forest Expt. Sta. Station Paper 28. 1953.

Comments on "A Site Evaluation Concept"

In the article, "A Site Evaluation Concept" by S. O. Heiberg and D. P. White[1] it is indicated that the use of volume for evaluating site quality is not generally practical in the United States. This may be true for volume per unit area; however, the average volume of the trees comprising the main canopy can be used as an indicator of site productivity. Gevorkiantz and Scholz[2] found that the average volume of the larger trees was the most satisfactory quantitative measure of site quality in understocked mixed oak stands in southwestern Wisconsin. In these stands the height of the dominant trees was shorter and the diameters greater than in more densely stocked stands. This method also appeared to be more reliable than height alone for oak site evaluations for more normally stocked stands in southern Michigan.[3]

Within forest stands of varying densities the use of diameter measurements in addition to height may provide a more sensitive measurement of tree growth than the use of height alone. This may be especially important in stands where the errors in height due to faulty measurements or malformed tree tops may be greater than the difference between the index classes.

Measurements for the average volume method are simple if volume tables for the trees comprising the main overstory are available. In addition to height and age, only diameter is needed.

The average volume is a direct measure of site productivity that can be easily converted into approximate volumes per unit area or into dollar values.

LESLIE W. GYSEL
Michigan State University

[1]Heiberg, Svend O. and Donald P. White. A site evaluation concept. Jour. Forestry 54:7-10. 1956.

[2]Gevorkiantz, S. R. and H. R. Scholz. Determining site quality in understocked oak forests. Jour. Forestry 42:808-811. 1944.

[3]Gysel, L. W. and J. L. Arend. Oak sites in southern Michigan: their classification and evaluation. Mich. State Coll. Agric. Expt. Sta. Tech. Bul. 236. 1953.

Reviews

Water: the Yearbook of Agriculture, 1955

Edited by Alfred Stefferud. 751 pp. Illus. Supt. of Documents, Washington 25, D. C. 1955. $2.

Probably the best of the current series on basic natural resources, the 1955 *Yearbook of Agriculture* on *Water* is outstanding for its organization, scope and contents, and down-to-earth, practical usefulness. One senses at once a new desire for agreement and cooperation among the various services of the government as to the objectives of and the approaches to water resource conservation. For example, there are many joint authorships by members of the different services. This accomplishment means orchids to the *Yearbook* committee and to the editor. It also means that water resource management is coming of age and taking on a new stature in our national conservation thinking.

Every forester has a professional responsibility in water resource management. Today it is not possible to sidestep or minimize this personal responsibility. For those who desire to broaden their understanding of water resources, it will be well worthwhile for them to browse through these 751 pages. There are so many good articles, it is impossible to mention them all here. It will be a personal pleasure for one to discover them for himself. However, here are a few titles at random to arouse the curiosity of forest administrators and forest managers:

The management of public watersheds.
Fire on the watershed of the nation.
Managing watersheds to provide better fishing.
Conservation begins on the watersheds.
How to get more snow water from public lands.
Drainage in forestry management in the South.

For those who already can read understandingly about water, there are some fine reviews of specific phases of the water cycle. Here are only a few:

Retention and transmission of water in the soil.
Phreatophytes a serious problem of the West.
Replenishing ground water by spreading.
Fog, mist, dew, and other sources of water.

In addition to articles on managing our watersheds *per se*, the *Yearbook* also contains a wealth of up-to-date and occasionally new information on water resources; for example, on cloud seeding, on underground sources of water, on irrigation, on saline encroachment, on drainage, on pollution, on water and our wildlife, and on water legislation.

If any weakness should be pointed out in the *Yearbook*, it would be the discussion of "Research, a Key to the Future," in the closing article. Here it is not so much the subject matter presented as the problem of outlining the subject in nontechnical language so that it could be better grasped by the busy layman.

The contributions by foresters to the 1955 *Yearbook* are considerable. Bernard Frank's "The Story of Water as the Story of Man" is a top-flight piece of writing. This reviewer also likes the article by G. L. Hayes and Jesse H. Buell on "Trees Also Need Water at the Right Time and Place." But there are many other fine contributions by foresters alone, or as joint authors.

Throughout the 1955 *Yearbook* it is emphasized that to have effective overall water conservation, it is necessary to have the willing and understanding cooperation of all landowners and land administrators. This can be achieved only when it is seen that water control will also mean easier and more profitable management of forest and agricultural land. To fill his place in the picture, a forester must have a working knowledge of water. This *Yearbook* is one that every forester, from the ground floor to the top brass, will want to actually own and frequently read. It will always be a good reference book.

CHARLES R. HURSH
Nashville, N. C.

Can We Solve the Farm Problem?

By Murray R. Benedict. 601 pp. Twentieth Century Fund, New York, N. Y. 1955. $5.

This highly competent work, which is an analysis of federal aid to American agriculture, is an outgrowth of a research project sponsored by The Twentieth Century Fund. A careful reader with no special training or experience in agricultural economics will find the book clearly written, intelligible, thought-provoking, and in many ways a rewarding exercise. Certainly, it has much to offer those who are directly concerned with farm policy.

The book has two main parts. The first, a detailed analysis of farm policy, devotes 11 chapters largely to an examination of farm problems from the New Deal and earlier to the present, the efforts of the federal government in launching a wide variety of programs to improve farm conditions, and an appraisal of the success of these programs. The author, Prof. Murray Benedict of the University of California, is a recognized authority in the field of agricultural economics.

The second part, ostensibly based on Benedict's analysis, attempts to grapple with the question: Where shall we go from here? It is a compact report, presented as chapter 12 by the Fund's Committee on Agricultural Policy. The committee, with 12 members, includes such distinguished economists as Theodore Schultz, John D. Black, Edwin G. Nourse, and Calvin B. Hoover.

Can We Solve the Farm Prob-

lem? is an important book because it deals so comprehensively with issues of significance to all of us. Parity, acreage allotments, price supports, government storage of surplus commodities, government credit aids, and conservation payments are all live issues. They are important to us who, as taxpayers, must foot the bill for government programs (more than $20 billion so far in agricultural aids since the New Deal) and as consumers who must pay the higher prices which result from some of these programs.

Research, service, and educational programs designed to improve living conditions on the farm and to aid farmers to lower costs and increase yields are described, generally approvingly. But the main concern of the book is with so-called "action programs" in which the government intervenes directly in marketing and production for the purpose of controlling supply, raising prices, or transferring income.

In recommending policies, the committee tries to move in a middle ground, recognizing government's important role while placing much reliance on freedom of enterprise. The most pressing problems it points to concern wheat, cotton, corn, and butter. Indicative of its approach are some of the recommendations for wheat: separate treatment for different varieties and qualities of wheat; price differentials that would reflect preferences of users ("let each type of wheat find its own relative level of price in a free market and provide whatever subsidy is felt to be warranted"), continuing limitations on acreage until wheat production and use can be brought into better balance; gradual movement in the direction of a freer and more stable world market; and moving excess stocks through foreign-aid and relief programs and, possibly, by channeling into lower-grade uses such as feed.

Agricultural conservation payments since the New Deal of some $3.5 billion (not including acreage allotment payments which have taken another $2.3 billion) repre-

WILEY BOOKS of INTEREST....

THE PRACTICE OF SILVICULTURE

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By Ralph C. Hawley and David M. Smith, both of Yale University. Primarily revised to highlight the biological and economic reasoning that underlies the various techniques of silviculture, this volume takes into account recent research and modern interpretations of old principles. The chapter on thinning has been doubled to emphasize the economic, physiological, and mensuration aspects of this important phase of silviculture. "Foresters, tree farmers, and other woodland owners will find this . . . edition to be the most authentic and up-to-date text available on the art and practice of growing forest trees. Tables, graphs, and comparative photographs add greatly to its clarity."—*Forest Notes*. 1954. 525 pages. $7.50.

PATHOLOGY IN FOREST PRACTICE

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By Dow Vawter Baxter, University of Michigan. "One of the noteworthy features of the book is the excellent way in which the author has integrated forest pathology with the many branches of forestry such as products, utilization, reforestation . . . and nursery practice . . . should be in the hands of all . . . concerned with the health of the forest. . ." —*Journal of Forestry*. 1952. 601 pages. $8.50.

PRACTICE OF WILDLIFE CONSERVATION

By L. M. Wing, formerly of Agricultural and Mechanical College of Texas. ". . . written in an extremely well-organized and readable style, which avoids scientific jargon and documentation. Each subject is treated briefly, but adequately, inasmuch as there is an excellent selection of references for further reading. . . . Progressive sportsmen, private, state, and federal administrators . . . will all find much of interest throughout the book."—*The Scientific Monthly*. 1951. 412 pages. $6.00.

FORESTRY IN FARM MANAGEMENT

Second Edition

By R. H. Westveld, University of Missouri, and the late Ralph H. Peck. "A thorough, up-to-date text in which basic principles of forest management are stated and practical farm forest techniques and equipment are described. . . The excellent arrangement of the material . . . is noteworthy. . . Professor Westveld writes authoritatively. . ."—*Agricultural Institute Review*. 1951. 340 pages. $5.50.

ELEMENTS OF ECOLOGY

By George L. Clarke, Harvard University. Deals with the relationships of both plants and animals and with both terrestrial and aquatic material. ". . . the book is sound and informative and reflects the wide experience of the author and his long conviction that there really is a teachable ecology of the land, sea, and fresh waters."—*Science*. 1954. 534 pages. $7.50.

FISHERY SCIENCE:

Its Methods and Applications

By George A. Rounsefell, U. S. Department of the Interior, and W. Harry Everhart, University of Maine. ". . . this book provides a useful summary of the methods and devices at the disposal of the fishery worker, whether fresh water or marine, and fills a longfelt need for a concise presentation of widely scattered materials." —*The Scientific Monthly*. 1953. 444 pages. $7.50.

THE PACIFIC NORTHWEST:

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Second Edition

Edited by Otis W. Freeman, Eastern Washington College of Education, and Howard H. Martin, University of Washington. With 26 contributors. 1954. 540 pages. $8.50.

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Forestry Suppliers is very pleased to announce that James W. Craig will return to the company as manager of the Consulting Division. Four years ago Mr. Craig was appointed State Forester of Mississippi at which time his private business activity of consulting and supply was incorporated as Forestry Suppliers, Inc. with Ben C. Meadows as President and manager. This business has operated under a board of directors made up of stock-holding foresters with Mr. Craig as chairman of the Board.

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sent another important area of government aids. The program is credited with having given much impetus to the soil conservation movement, but, the committee states: "If continued indefinitely, they (payments) become, mainly, thinly spread subsidies to many farmers who are already using good soil-conserving practices." A further suggestion along these lines has gained much attention in current news under the term "soil bank." The committee states: "In cases where there is need for severe readjustment in the acreages of given crops, in connection with allotments and quotas, special payments may be warranted for a time to encourage the shift of unused acreages to soil-conserving uses with a view to keeping them out of all types of commercial use for a limited period."

Farm woodlands are scarcely recognized in the book as, in fact, they have won comparatively little attention in the agricultural programs which have evolved over the years. This will disappoint foresters who feel that farm woods can contribute considerably more than they have both as an aid to farmers and as an aid to the national forest economy. Perhaps neglect of woodlands in this book was inevitable since the text deals mainly with programs relating to commercial agriculture, and it is on the low-production farms that forestry has the most to offer. Foresters can only hope for a fuller consideration of the role of farm woods when studies of the problems of the several million low-production farms are made.

LEE M. JAMES
Michigan State University

Publications of Interest

A Bibliography on Forest Genetics and Forest Tree Improvement, 1954 has been prepared by Jonathan W. Wright, geneticist, of the Northeast Forest Experiment Station, U. S. Forest Service, 102 Motors Ave., Upper Darby, Pa. Prepared at the request of the S.A.F. Committee on Forest Tree Improvement, the bibliography was compiled from standard forestry, botanical, and abstracting journals, experiment station publications, and correspondence with tree breeders in this country and abroad. Copies may be obtained from the Station at the above address.

* * *

Forest Tree Improvement for the South is a brochure prepared by the Committee on Southern Forest Tree Improvement. It is an attractively prepared, popular interest publication. Copies may be secured from the chairman of the Committee, T. E. Bercaw, Pulp and Paper Mill Division, Gaylord Container Corp., Bogalusa, La.

* * *

Prepared and published by the Alabama Forestry Council for the use of Alabama farmers owning timberland, the booklet *Forestry Handbook* is a handy reference for owners throughout the South.

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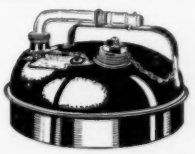

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Current Literature

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Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

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Society Affairs

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DEWITT NELSON

Water! Strike up a weather conversation with a stranger and you open the flood gates of water problems, whether he be from California, Texas, or Delaware. Invariably there has been too much or too little, a flood or a drought, a problem of retention or distribution, a lack of upstream and downstream programs or inadequate watershed management and water control.

The spotlight of attention is now being focused with renewed intensity on water and related problems at local, state, and national levels. The President's advisory committee on water has completed its task and the President is recommending a National Water Policy and calling for closer coordination at all levels of planning, programming, and development.

This should be a signal to both private and public foresters for greater consideration of water problems in their land and resource management plans and operations. There is a direct relationship between water, land, and forest cover. There is also a direct relationship between adequately developed water resources and the location of forest product processing plants, and in turn, between full resource utilization and new industries, employment, and taxes. Adequate water supplies in strategic areas can provide the medium for establishing new horizons in our forest economy and forest practices.

Good forestry is as much a matter of economics as it is of silviculture, for management programs must be economically sound before they can be translated into silvicultural practices. Variety in wood processing plants should mean better markets, better stumpage prices, better utilization, and better forestry. At the same time, lucrative markets for raw material may readily create an incentive for over-cutting by some classes of forest ownership and thereby endanger plant investment.

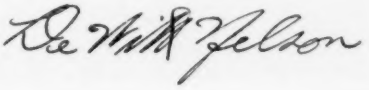
Likewise, many wood processing plants create new problems of water pollution control. Here the industry and the foresters have two important tasks facing them: (1) the development of methods and techniques for minimizing the pollution hazards—the industry has made great strides in this field—and (2) the public relations job of convincing downstream users that the waste discharge will not endanger the water quality for other uses. I have recently seen a failure in this public relations field prevent the establishment of a vitally important forest products industry.

I have seen but few foresters and forest industry representatives in attendance at water conferences. Yet, a high percentage of the precipitation falls on forest lands. The manner of land treatment and the type of resource management constitutes a vital role in water conservation. Our ability to retard runoff, impound flood and seasonal peak flows, maintain stream levels, and develop distribution systems will dictate our ultimate economic development, the location of industries, and the complete utilization of raw materials. This whole program will require the integration of land and resource planning and management.

Because of our total dependence upon water and its relationship to rural, urban, industrial, and forest development, I urge all foresters and the forest industry to take more interest in water plans and to participate in their development.

In many areas a good place to start is at the local level in working with the Small Watershed Program as set up under Public Law 566, 83rd Congress. Under this law, land and resource management play a dominant role. But as good forest managers we do not need to restrict this type of land treatment to affiliation with any specific program or statutory demand.

There are many subjects under the relationship of forest management and forest products to water conservation and water use that would provide valuable discussion material at S.A.F. Chapter meetings.



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School Box Score
1956 Membership

School	Student applications received March 1956	Total 1955	Total 1956
Alabama Polytechnic Institute	6	18	6
University of California	0	17	28
Colorado A & M College	3	9	16
Duke University	1	3	3
University of Florida	0	17	3
University of Georgia	0	28	0
University of Idaho	2	4	10
Iowa State College	1	22	6
Louisiana Polytechnic Institute	0	13	12
Louisiana State University	0	43	9
University of Maine	1	12	8
University of Massachusetts	1	11	10
Michigan State University	6	14	12
University of Michigan	2	21	14
University of Minnesota	8	19	18
University of Missouri	0	26	0
Montana State University	4	25	16
State University of New York	0	23	32
North Carolina State College	0	22	1
Oregon State College	8	38	13
Pennsylvania State University	1	32	1
Purdue University	1	24	15
Utah State Agricultural College	0	12	6
University of Washington	6	28	11
West Virginia University	0	26	1
Yale University	3	16	8
	54	523	259

Section Box Score
1956 Membership

Section	Applications received[1] March 1956	Total 1955	Total 1956
Allegheny	4	63	5
Appalachian	2	38	9
Central Rocky Mountain	3	12	16
Central States	1	44	16
Columbia River	14	100	24
Gulf States	2	107	29
Inland Empire	3	10	14
Intermountain	0	18	8
Kentucky-Tennessee	2	9	4
New England	7	50	31
New York	0	33	32
Northern California	4	33	35
Northern Rocky Mountain	6	44	22
Ozark	1	47	4
Puget Sound	8	65	22
Southeastern	8	85	20
Southern California	0	3	0
Southwestern	0	12	0
Upper-Mississippi Valley	10	51	27
Washington	0	2	0
Wisconsin-Michigan	10	40	37
	85	866	355

[1]Student, Junior, Affiliate, Associate (Initial) grades only.

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But perhaps more outstanding than their volume is the program adopted by the citizenry to preserve forest heritages.

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In 1905, a lumber company erected the nation's first fire lookout tower on Big Squaw Mountain, near Greenville. Of more general significance was the establishment in 1909 of the Maine Forestry District Law bringing unorganized townships and adjacent areas together into Administrative Districts for fire protection. This plan is unique in that all landowners in a district share proportionately in the cost of this fire protection through property taxes. (Forest fires in organized towns are the original responsibility of town forest fire wardens.)

Maine was one of the first states to adopt aircraft in their forestry program, using them first in 1927.

In 1921, the citizenry declared organized war on insects which account for an average loss 20 times greater,—although far less spectacular,—than flames. Forest industry workers, insect wardens, fire wardens and others cooperate in a program of detection and study that is helping to control the insect menace.

Still a third front is that of protection from tree disease. Attack on this front was begun in 1917, with a program for control of white pine blister rust. Today control is aimed also at ash rust, Dutch elm disease and eastern dwarf mistletoe.

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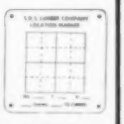

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OFFICERS of the Southeastern Section. *L* to *R*, Lester L. Harris, secretary-treasurer for 1955; George Anderson, secretary-treasurer for 1956; Jack T. May, chairman, 1955; James F. Spiers, chairman for 1956; and F. Herbert Robertson, chairman elect for 1956 who will succeed to the chairmanship in 1957.

Southeastern Section Holds Annual Meeting

A well attended meeting of the Southeastern Section was held on January 20 and 21 in the Whitley Hotel, Montgomery, Ala.

Chairman Jack T. May presided at the business sessions. Two technical programs were presented; W. R. Sizemore and Harold E. Christen presided.

Among the speakers were Frank Heyward of Gaylord Container Corporation, Alexander L. Setzer of the Corps of Engineers, A. I. Jeffords of Union Bag & Paper Corporation, Lee S. Settel of the Appalachian Oak Flooring and Hardwood Corporation, and William C. Hammerle of the Southern Pine Marketing Institute.

J. Hilton Watson was master of ceremonies at the Section dinner which was attended by nearly 300 members and 100 ladies. Henry Clepper was the speaker.

New officers for 1956 were installed as follows:

Chairman, James F. Spiers.

Chairman-elect, F. Herbert Robertson.

Secretary, George A. Anderson.

Appalachian Section Holds Annual Meeting

The annual winter meeting of the Appalachian Section was held January 27 and 28 at Durham, N. C. in the Washington Duke Hotel. More than 200 members were in attendance.

A panel discussion was held on economic aids and incentives for forest management. Among the speakers were Roger Huff of the Internal Revenue Service, Atlanta, Ga.; Monroe Green of the South Carolina Insurance Company, Columbia, S. C.; Wayne Coperning, a banker, of Winston Salem, N. C.; and H. C. Mitchell of the Soil Conservation Service, Atlanta, Ga. C. H. Stoltenberg of the Duke University School of Forestry was moderator of the panel.

The Section's annual dinner was attended by fifty ladies in addition to the members. D. J. Morriss was toastmaster. Paul M. Dunn, technical director of forestry for the St. Regis Paper Company of New York City was the speaker.

At the Section's business meeting new officers were installed:

Chairman, P. T. Lannan, Jr., Box 531, Georgetown, S. C.

Vice chairman, T. W. Maki, School of Forestry, North Carolina State College, Raleigh, N. C.

Secretary, C. H. Stoltenberg, Duke University School of Forestry, Durham, N. C.

Membership Now Exceeds 10,000

Total Society membership, as of December 31, 1955 was 10,611—a net in-

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crease of 692 over 1954. With the continued cooperation of the Sections, Chapters, Schools, and members, Society membership will exceed 11,000 by December 31, 1956.

During 1955 a total of 1,318 names (including 407 reinstatements) were added to the membership list. Terminations during the year were 644, of which 443 were dropped for nonpayment of dues. Membership figures for the 5-year period, representing an increase of 25 percent, follow:

Year	*Membership*
1951	8,472
1952	9,087
1953	9,557
1954	9,919
1955	10,611

As of December 31, 1955 there were 805 Student members—the highest number, at the same period, since the initiation of this grade. Figures for previous years were: 1951 (548); 1952 (566); 1953 (527); 1954 (625). There has been, also, a substantial increase in the Affiliate grade. More graduates of nonaccredited schools and of accredited schools of nonapproved curricula are applying for Society membership. Since 1951 the increase in this grade exceeds 100 percent.

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T. Edward Shaw (1897-1956)

Thomas Edward Shaw, 59, a member of the faculty of the Purdue University Department of Forestry, died in Lafayette, Ind., January 21.

Born January 3, 1897 in Chester, Pa., he was graduated in 1921 from the Pennsylvania State Forest Academy at Mont Alto. Subsequently, he obtained the M. F. degree from Harvard University.

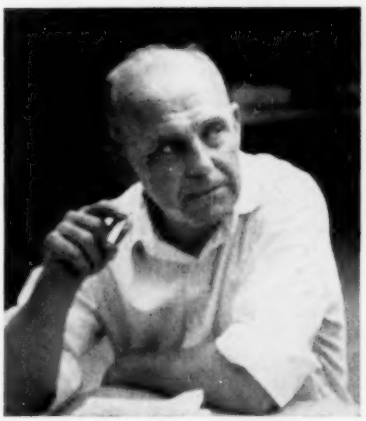
He had a varied and productive career in forestry, beginning with two years as a field forester in the Pennsylvania Department of Forests and Waters. In 1923 he was appointed to the faculty at Mont Alto with the dual title of registrar and instructor and served in this position for five years.

Following graduate work at Harvard, in 1930 he became the first extension forester of Indiana, and served for twelve years until the advent of World War II. In 1942 he was asked to accept appointment as acting state forester of Indiana as a temporary war measure, meanwhile continuing as state extension forester.

Following the war he was appointed to the forestry faculty at Purdue where he served until his death, except for two years leave of absence as a forestry technician in The Lebanon during which period he taught in the university at Beirut and also carried on field duties.

The author of several bulletins on forestry subjects, he was also active in public educational work in natural resource conservation on the radio and television.

Shaw was the subject of a full length biography in the "We Present" series, published in the JOURNAL OF FORESTRY for May 1951.



T. EDWARD SHAW

Necrology

December 1, 1954-December 31, 1955

Fellow

Greeley, Col. W. B., Suquamish, Washington
Mulford, Prof. Walter, Berkeley, California

Member

Berry, William Burnett, Placerville, California
Briem, A. J., Lowell, Oregon
Cecil, George H., Whittier, California
Covington, Duane M., La Grande, Washington

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Osborne, W. B., Jr., Portland, Oregon
Pike, Galen W., Duluth, Minnesota
Schanche, H. G., Jr., Rumford, Maine
Smith, Charles E., Jensen, Utah
Thaler, Vern H., Gaylord, Michigan
Vaux, C. H., Vancouver, B. C., Canada
Wilson, Donald W., John Day, Oregon
Wolff, Meyer H., Missoula, Montana

Junior

Hardy, James H., Philadelphia, Mississippi
Lopardo, Frederick A., Conway, South Carolina
Smith, Barnett J., Ontario, Canada
Zink, Harvey E., Eureka, California

Affiliate

Coleman, Robert E., Portland, Oregon

Associate

Brown, W. R., Dublin, New Hampshire
Palmer, T. S., Washington, D. C.
Rochester, Donald M., Long Island, New York
Will, George F., Bismarck, North Dakota

Student

Weldy, Walter E., Auburn, Alabama

R. M. Wirka (1896-1956)

Raymond M. Wirka, 59, assistant chief of the Division of Forest Products Research, U. S. Forest Service, Washington, D. C. died January 10, following a stroke while in his office.

Born October 4, 1896 in Madison, Wis., he attended the University of Wisconsin where he was awarded the B.S. degree in mechanical engineering in 1918 and the degree mechanical engineer in 1931.

During the period 1918-1941 he was a research engineer for the Forest Products Laboratory at Madison. In the later year he was assigned as technologist to the Division of Forest Products in the Washington, D. C. office of the Forest Service, and in 1944 was advanced to assistant chief.

Mr. Wirka made many contributions to improved wood utilization and to the literature of wood technology.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatements received in the Society office during the month of January are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of April 1, 1956. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

PENNSYLVANIA STATE UNIVERSITY
Upp, D. A.

Junior Grade

Cornely, J., 537 S. St., Clarion, Pa. Reinstatement.
Hess, K. W., Forester, Pa. Dept. Forests & Waters, Bloomsburg, Pa.; Pa. State, B.S.F., 1950.
Nelson, J. C., Blain., Pa. Reinstatement.
Ropeik, B. H., 415 Edsdale Rd., Baltimore, Md. Reinstatement.
Sheay, R. J., Map Draftsman, Wharton Survey Office, Egg Harbor, N. J.; Univ. of Maine, B.S.F., 1955.

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Walker, S. J., Asst. Forester, Dept. of Cons. & Dev., Egg Harbor, N. J.; State Univ. of N. Y., B.S.F., 1953.
Wilson, J. W., Dept. of Forests & Waters, Clearfield, Pa. Reinstatement.

Member Grade

Johns, H. R., Training Dir., Asplundt Tree Expert Co., Bryn Athyn, Pa.; Purdue, B.S.F., 1950; Mich. State, M.F., 1951. (Junior, 1950).
Robertson, R. J., Asst. Dist. Forester, Dept. of Forests & Parks, Pocomoke City, Md. (Junior, 46R53).

Appalachian Section

Student Grade

DUKE UNIVERSITY
Calkins, C. S.

Junior Grade

Blanchard, G. M., 2910 O'Berry St., Raleigh, N. C. Reinstatement.

Member Grade

Pettit, C. C., Box 936, Sylva, N. C. Reinstatement.
Price, H. R., 11 Soco St., Asheville, N. C. Reinstatement.
Witter, C. J., 608 Cabel Avenue, Charlottesville, Va. Reinstatement.

Affiliate Grade

Fox, W., Asst. Dist. Ranger, U.S.F.S., Burnsville, N. C.

Central Rocky Mountain Section

Student Grade

COLORADO A & M COLLEGE
Bunner, R. O. Hunt, W. H.
Ericson, J. E.

Junior Grade

Flamm, B. R., 320 Plum St., Ft. Collins, Colo.; Colo. A & M, B.S.F., 1955. (Student, 1953).
Newkirk, B. R., U.S.F.S., Boulder, Colo. Reinstatement.

Member Grade

McNutt, J. J., Staff Asst., U.S.F.S., Denver, Colo. Reinstatement.
Terrell, C. L., 1025 W. Mulberry, Ft. Collins, Colo. Reinstatement.

Central States Section

Student Grade

PURDUE UNIVERSITY
Cooper, R. A.

Junior Grade

Kopecky, F. J., U.S.F.S., Ironton, Ohio. Reinstatement.
Micklewright, J. T., Box 760, Carbondale, Ill. Reinstatement.

Columbia River Section

Student Grade

OREGON STATE COLLEGE
Carter, J. K. Hill, C. V.
Ebner, T. J. Hooper, J. E.
Flenner, R. G. Kinkead, R. R.
Foley, R. M. Wells, D. K.

Junior Grade

Browne, C. H., Partner, Shamrock Lbr. Co., Eugene, Oregon; Ore. State, B.S.F., 1946.
Carroll, R. J., Forester, Bur. of Land Mgmt., Medford, Ore.; State Univ. of N. Y., B.S.F., 1951.
Crooks, A. E., Forester, U.S.F.S., Sister, Ore.; Pa. State, B.S.F., 1951.
Kintigh, R. G., Forester, Tree Farm Mgmt. Service, Eugene, Ore. Reinstatement.
Kirkpatrick, R., Meteorologist, Melin Meteorological Service, Portland, Ore.; Univ. of Idaho, B.S.F., 1938.
Vandershule, T. D., 244 North G, Cottage Grove, Ore. Reinstatement.
Youngblood, R. A., Dist. Forester, Bur. of Land Mgmt., Coos Bay, Ore. Reinstatement.

Member Grade

Barzler, W. J., Forester, Long-Bell Lbr. Co., Longview, Wash. (Junior, 1949).
Beckim, G. A., Dist. Warden, State of Wash., Vancouver, Wash. (Junior, 40R55).
Bell, J. F., Mgmt. Asst., Ore. State Board of Forestry, Eugene, Ore. (Junior, 1949).
Beswick, R. A., 9017 Silver Star Ave., Vancouver, Wash. (Junior, 1949).
Bullard, W. E., Watershed Mgmt., U.S.F.S., Portland, Ore. (Junior, 35R51).
Burgess, T. H., Asst. Reg. Forester, U.S.F.S., Portland, Ore. (Junior, 25R35R55).
Christy, W. H., Rt. 1, Box 600, Warrenton, Ore. (Junior, 47R55).
Cleveland, G. E., Rt. 3, Box 189, Bend, Ore. (Junior, 1949).
Collins, T. E., Gen. Del., Mapleton, Ore. (Junior, 1949).
Cooper, R. L., Dist. Ranger, U.S.F.S., Klamath Falls, Ore. (Junior, 1949).
Corlett, J. B., Industrial Forester, O.P. & P. Co., Salem, Ore. (Junior, 1949).
Crawford, R. W., Forest Supv., U.S.F.S., Bend, Ore. (Junior, 31R55).
Didriksen, R. G., Adm. Asst., U.S.F.S., Pendleton, Ore. (Junior, 1949).
Harvey, G. M., Research, U.S.F.S., Portland, Ore. (Junior, 1949).
Heeren, G. C., Forester, Bur. of Indian Affairs, Warm Springs, Ore.. (Junior, 1949).
Hendrix, J. R., U.S.F.S., Grants Pass, Ore. (Junior, 1949).
Hisey, J. M., Industrial Forester, Castle Rock, Wash. (Junior, 1949).
Holtsclaw, W. P., Ore. State Board of Forestry, Jewel, Ore. (Junior, 1949).
Hyder, D. N., Range Research, Squaw Butte Expt. Sta., Burns, Ore. (Junior, 1949).
Jackson, R. H., Industrial Forester, Wallowa, Ore. (Junior, 1949).
Johannsen, W. B., U.S.F.S., Burns, Ore. (Junior, 1949).
Johnson, R. W., Industrial Forester, Castle Rock, Wash. (Junior, 1949).
Judkins, D. H., Forest Eng., B.L.M., Portland, Ore. (Junior, 36R55).
Kittelson, J. M., Forester, Long-Bell Lbr. Co., Longview, Wash. (Junior, 1949).
Leavengood, G. R., U.S.F.S., Estacada, Ore. (Junior, 1949).
Liniger, P. F., 7534 S.E. 19th Ave., Portland, Ore. (Junior, 43R55).
Mallery, W. T., Dist. Ranger, U.S.F.S., Baker, Ore. (Junior, 1949).
McComb, D. P., Oregon State Board of Forestry, Salem, Ore. (Junior, 1949).
McComb, F., Supv., U.S.F.S., John Day, Ore. (Junior, 1949).
Pagter, L. B., Industrial Forester, Prineville, Ore. (Junior, 1949).
Sankela, W. E., B.L.M., Portland, Ore. (Junior, 32R55).
Sasser, A. H., Farm Forester, Eugene, Ore. (Junior, 1949).
Sauerwein, W. J., Soil Cons. Service, Corvallis, Ore. (Junior, 1949).
Steenbergen, J. T., Industrial Forester, Brookings, Ore. (Junior, 46R55).
Voris, C. R., Ore. State Board of Forestry, Salem, Ore. (Junior, 1949).
Wardell, G., K. F. Prot. Asso., Klamath Falls, Ore. (Junior, 1949).
Wiener, A. A., U.S.F.S., Portland, Ore. (Junior, 45R55).

Affiliate Grade

Daughs, D. A., Logging Supt., Collins Pondosa Lbr. Co., Pondosa, Ore.

Associate Grade

Saltzman, W. O., Fishery Agent, Ore. State Game Comm., Reedsport, Ore.; Ore. State, M.S., (Fish & Game Mgmt.), 1953.

Gulf States Section

Junior Grade

Duty, J. W., 3228 Levin St., Alexandria, La. Reinstatement.
Lodge, G. W., Box 1258, Springhill, La. Reinstatement.

Member Grade

Andrews, J. R., 2103 Douglas, Leesville, La. (Junior, 1949).
Bonner, J. D., Box 128, Quitman, Miss. (Junior, 1949).
Campbell, R. A., Procurement Forester, M. A. Pope, Walker, La. (Junior, 1949).
Cann, J. J., 6 First St., Grenada, Miss. (Junior, 39R50).
Church, R. E., 515 McCormick Ct., Brookhaven, Miss. (Junior, 1948).
Coyne, J. F., Box 151, Gulfport, Miss. (Junior, 1948).
Cross, J. K., Box 27, Wiggins, Miss. (Junior, 1949).
Curtis, J. E., Woods Supt., M. A. Pope, Hammond, La. (Junior, 1948).
Danielson, W. W., Box 428, Tupelo, Miss. (Junior, 1949).
Evans, A. E., 231 Wilshire Ave., Jackson, Miss. (Junior, 1949).
Foster, G. W., Box 643, Many, La. (Junior, 1948).
Hedlund, A., Forester, U.S.F.S., New Orleans, La. (Junior, 1949).
Hoover, E. B., Box 254, Brandon, Miss. (Junior, 1949).
Jones, R. E., Box 521, Quitman, Miss. (Junior, 1948).
Judson, G. M., Forester, U.S.F.S., New Orleans, La. (Junior, 1949).
Lapham, V. T., Box 233, Denham Springs, La. (Junior, 1949).
Marlin, C. B., Box 649, Jackson, Miss. (Junior, 1940).
Morris, R. C., Box 693, Leland, Miss. (Junior, 1949).
Neman, B., Forester, LeMieux Bros., New Orleans, La. (Junior, 37R51).
Pearl, R. W., U.S.F.S., Gloster, Miss. (Junior, 1949).
Pomerening, D., Box 27, Wiggins, Miss. (Junior, 1949).
Raymund, R. G., Box 217, Pollock, La. (Junior, 1948).

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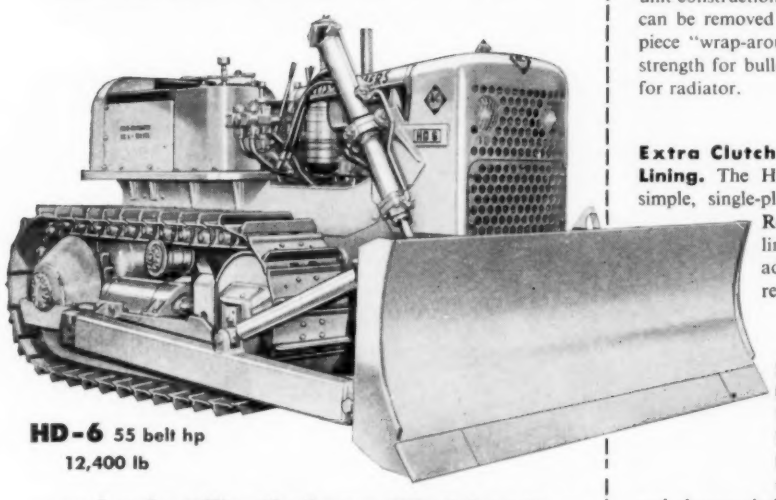

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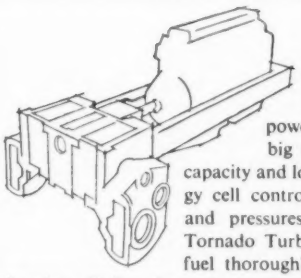
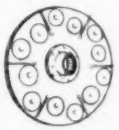


Allis-Chalmers Heavy-Duty Diesel Engine. The HD-6 power plant is designed for big output, ample reserve capacity and low maintenance. Energy cell controls combustion timing and pressures for high efficiency. Tornado Turbulence mixes air and fuel thoroughly for more complete burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

Special Strength and Protection. Exclusive all-steel box-A main frame makes possible superior over-all balance, better equipment mounting . . . plus service simplicity of unit construction. Major assemblies like engine and clutch can be removed without disturbing adjacent parts. One-piece "wrap-around" radiator guard provides maximum strength for bulldozer mounting . . . complete protection for radiator.



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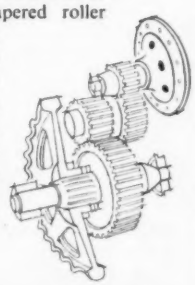
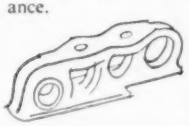


Straddle-Mounted Final Drive Gears. Tapered roller bearings support both ends of the final drive gear shafts. Smaller gears and shorter shafts (plus line-bored, one-piece case), provide better bearing and gear alignment, more strength, longer life. Double-reduction final drives provide greater ground clearance.



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Rice, H. P., P. O. Box 96, Rolling Fork, Miss. (Junior, 1949).
Schmidt, H. N., Area Forester, Gaylord Container Corp., Clinton, La. (Junior, 1949).
Silker, T. H., Rt. 3, Kirbyville, Texas. Reinstatement.
Stephens, M. A., 1100 Carolyn Avenue, Columbia, Miss. (Junior, 1949).
Sternitzke, H. S., Forest Economist, S. Forest Expt. Sta., New Orleans, La. (Junior, 1947).
Tucker, R. E., Forester, So. Advance Bag & Paper, Jonesboro, La. (Junior, 1948).
Walker, E. M., 122 N. 5th St., McComb, Miss. (Junior, 1948).
Walsh, G. H., Forester, Sabine Lbr. Co., Zwolle, La. (Junior, 1948).

Affiliate Grade

Sweeney, J. B., Box 302, Nacogdoches, Texas; Stephen F. Austin State College, B.S., (Forest Mgmt.), 1953.
Colbert, F., Forester, U.S. Gypsum Co., Greenville, Miss.

Inland Empire Section

Student Grade

UNIVERSITY OF IDAHO
Bynum, H. H. Wilcox, J. T.

Junior Grade

Baldwin, R. R., 440 E. 7th St., Moscow, Idaho; Univ. of Idaho, B.S.F., 1955. (Student, 1955).

Affiliate Grade

Miller, C. J., Forester, St. Joe Natl. Forest, St. Maries, Idaho.

Intermountain Section

Member Grade

Burkholder, R. C., Box 324, McCall, Idaho. (Junior, 1949).
Fee, M. W., Box 1028, McCall, Idaho. (Junior, 1949).
Lobenstein, H. L., Asst. Reg. Forester, U.S.F.S., Ogden, Utah. (Junior, 1949).
Mitchell, Y. A., Forester, Caldwell Lbr. Co., Boise, Idaho (Junior, 40R55).

Junior Grade

Prausa, R. L., Asst. Dist. Ranger, U.S.F.S., Idaho City, Idaho. Reinstatement.
Rowen, R. A., Forester, U.S.F.S., Cascade, Idaho. Reinstatement.

Kentucky-Tennessee Section

Junior Grade

Hile, S. G., Dist. Forest Ranger, U.S.F.S., Morehead, Ky.; N. C. State, B.S.F., 1930.

Member Grade

Hafele, M. F., Wood Procurement, Mead Corp., Ashland, Ky. (Junior, 1948).
Johnson, G. T., Asst. Dist. Ranger, U.S.F.S., Greeneville, Tenn.; Univ. of Minn., B.S.F., 1951. (Junior, 1952).
Mitchell, A. L., Forester, Ky. Div. of Forestry, Barlow, Ky. (Junior, 1949).
Montgomery, C. R., Chief Ranger, Mammoth Cave Natl. Park, Ky. (Junior, 1949).

Associate Grade

Baggenstoss, H. E., Director, Forest Farmers Assoc., Tracy City, Tenn.

New England Section

Student Grade

UNIVERSITY OF MAINE
Culver, D. H.
UNIVERSITY OF MASSACHUSETTS
Kimball, E. C.
YALE UNIVERSITY
Hermann, R. K. Ticknor, W. D.
Hoadley, R. B.

Junior Grade

Drisko, W. H., 64 W. Street, Bangor Maine; Univ. of Maine, B.S.F., 1950.
Osgood, E. A., 30 Elizabeth Ave., Bangor, Maine, Univ. of Maine, B.S.F., 1951.
Winn, M. S., 244 Grandview St., Bennington, Vt. Reinstatement.

Member Grade

Alexander, B. R., Minas Basin Pulp & Power Co., Ltd., Hantsport, Canada. Reinstatement.
Anderson, 140 Oak St., Greenwood, Mass. (Junior, 1949).
Jarm, V. J., 161 Amherst St., Hartford, Conn. (Junior, 1949).
Johnston, R. B., Forester, N.E. Forest Industries, Center Harbor, N. H. (Junior, 1949).
Richardson, G. F., Dist. Leader, U.S.F.S., Lebanon, N. H. Reinstatement.

New York Section

Junior Grade

Erwin, E. B., Lyons Falls, N. Y. Reinstatement.

Northern California Section

Junior Grade

Clark, K. M., Logging Eng., Humboldt Fir, Inc., Hoopa, Calif.; Oregon State, B.S.F., 1943.
Countryman, C. M., Calif. Forest & Rge. Expt. Sta., Berkeley, Calif. Reinstatement.
Hickerson, C. W., Asst. Dist. Ranger, U.S.F.S., Greenville, Calif.; Oregon State, B.S.F., 1951.
Martinek, J. A., Sequoia Natl. Park, Three Rivers, Calif. Reinstatement.
Nyholm, E. J., 727 - 11th Street, Crescent City, Calif. Reinstatement.

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Shaw, W. D., Forest Trainee, Calif. Div. of Forestry, Fresno, Calif.; Utah State Agric., B.S.F., 1952.
Smart, E. F., U.S.F.S., Hayfork, Calif. Reinstatement.
Smith, K. O., Box 392, Willits, Calif. Reinstatement.
White, K. J., Box 566, Ripon, Calif. Reinstatement.

Member Grade

Vance, G. B., 800 Richmond Road, Susanville, Calif. Reinstatement.

Affiliate Grade

Dudley, G. A., Asst. Forest Tech., Calif. Div. of Forestry, Mendocino, Calif.

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY

Howell, H. H. — Poole, R. B.
Howell, K. E. — Slajer, C. E.

Junior Grade

Bolle, A. W., Asso. Prof., Montana State Univ., Missoula, Mont.; Mont. State, B.S.F., 1937.

Member Grade

Fields, R. E., U.S.F.S., Missoula, Mont. Reinstatement.

Affiliate Grade

Clark, J. D., Forester, North Western Pulp & Power Ltd., Hinton, Alberta, Canada; Univ. of B.C., B.S., (Forestry), 1949.

Ozark Section

Junior Grade

Van Slyke, C., Centerville, Mo. Reinstatement.

Affiliate Grade

Ray, R. D., Forest Tech., Crossett Lbr. Co., Hamburg, Ark.; Ark. A & M, B.S., (Forestry), 1953.

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINGTON

Arneson, N. A. — Marenakos, J. B.
Graber, R. E. — Steen, H. K.
Lloyd, C. C. — Waldhaus, F. H.

Junior Grade

Downen, E. R., 218 S. Francis, Port Angeles, Wash. Reinstatement.
Hoffmann, E. J., 1707 Foraker St., Anchorage, Alaska. Reinstatement.

Affiliate Grade

Lathrop, J. R., Forester, Wash. State Div. of Forestry, Olympia, Wash.; Wash. State, B.S., (Forestry), 1954.
Trautman, K. L., Field Forester, Port Blakely Mill Co., Seattle, Wash.; Wash. State, B.S., (Forestry), 1955.

Southeastern Section

Student Grade

ALABAMA POLYTECHNIC INSTITUTE

Brown, R. C. — Miles, R. V.
Davis, H. V. — Plummer, G. M.
Farrar, R. M. — Vilece, E. A.

Junior Grade

Baker, R. C., 464 College Ave., Athens, Ga.; Univ. of Ga., B.S.F., 1955. (Student, 1955).
Blackerby, J. H., 2040 Atkinson St., Brunswick, Ga., Reinstatement.
Dubow, D. A., Forester, Union Bag & Paper Corp., Savannah, Ga.; N. C. State, B.S.F., 1950; M.F., 1954.
Hutchins, J. P., Box 310, Andalusia, Ala. Reinstatement.
Kirby, W. C., Brunswick Pulp & Paper Co., Brunswick, Ga. Reinstatement.
Lantz, N. J., Gair Woodlands Corp., Sanderson, Fla. Reinstatement.
Maupin, W., Box 362, Swainsboro, Ga. Reinstatement.
Moore, S. P., Georgia Forestry Comm., Statesboro, Ga. Reinstatement.
Sheffield, J. E., Self-employed, Quitman, Ga.; Univ. of Ga., B.S.F., 1955.

Member Grade

Swofford, T. F., 1144 Birch St., Macon, Ga. Reinstatement.

Upper-Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Syndergaard, L. E.

UNIVERSITY OF MINNESOTA

Johnson, R. R. — Pinska, D. M.
Knopp, T. B. — Roessler, T. W.
Kubitza, T. V. — Salo, M. E.
Mecklenburg, K. F. — Schutz, R. J.

Junior Grade

Falbo, J., 2708 3rd Ave. E., Hibbing, Minn.; Univ. of Minn., B.S.F., 1938.

Member Grade

Ahlgren, C. E., North Woods Trading Co., Ely, Minn. (Junior, 1949).
Bober, E. J., Asst. Ranger, U.S.F.S., Bena, Minn. (Junior, 1949).
Campbell, D., Towner, N. D. (Junior, 1949).
Colburn, F. O., Asst. County Agent, Itasca County, Minn. (Junior, 1949).
Hall, O. F., Asst. Prof., Univ. of Minn., St. Paul, Minn. (Junior, 1949).
Heinselman, M. L., Research Forester, Lake States Forest Expt. Sta., Grand Rapids, Minn. (Junior, 1949).
Lind, O. E., Asst. Ranger, U.S.F.S., Marcell, Minn. (Junior, 1949).
Madden, E., Wildlife Resident Biologist, Soil Cons. Service, Devils Lake, N. D. (Junior, 1948).
Rickert, L. H., Logging Contractor, Walker, Minn. (Junior, 1949).
Smith, R. A., Forester, Northwest Paper Co., Cloquet, Minn. (Junior, 1949).
Thompson, T. A., Forester, Tomahawk Timber Co., Forest Center, Minn. (Junior, 1949).
Yurchyshyn, D., Forest Engineer, M. A. Hanna Co., Hibbing, Minn. (Junior, 1949).

Washington Section

Member Grade

Leisenring, L. S., 46 Duvall St., S.E., Washington, D. C. Reinstatement.

Wisconsin-Michigan Section

Student Grade

MICHIGAN STATE UNIVERSITY

Chorman, D. H. — Larmore, F. D.
Greene, W. B. — Sachs, R. D.
King, J. P. — Thompson, H. R.

UNIVERSITY OF MICHIGAN

Barth, H. E. — Paller, W.

Junior Grade

McCoy, H. W., 366 Snyder, E. Lansing, Mich.; Mich. State, B.S.F., 1955. (Student, 1954).
Poppy, R. E., 231 Valley Ct., E. Lansing, Mich.; Mich. State, B.S.F., 1955. (Student, 1954).
Ratcliff, R. C., Supv., Consumers Power Co., Jackson, Mich.; Mich. State, B.S.F., 1949.

Affiliate Grade

Dubey, D. E., Nursery Foreman, Kimberly-Clark of Mich., Inc., Iron Mountain, Mich.

Foreign

Junior Grade

Cook, H. C. F., Inter American Inst. of Agric. Sciences, Gatun, Canal Zone. Reinstatement.

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Forestry News

Southern Forest Fire Prevention Conference

Plans for a South-wide conference of civic, business, and political leaders to attack the problems of wildfires in southern forests which cost more than a quarter of a billion dollars a year have neared completion according to Lowell Besley, executive director of the American Forestry Association.

Endorsed by the Conference of Southern Governors, the meeting will be held in New Orleans April 13-14 and the general public is invited to participate along with representatives named by the governors of the various states, said Besley, who is general chairman of the Southern Forest Fire Prevention Conference.

"This first such effort of its kind on a South-wide basis is one in which the sponsors are hoping that landowners, farmers, civic club officers, members of garden clubs, businessmen, judges, district attorneys, educators, sheriffs, sportsmen, and all those interested in protecting southern woodlands will join with foresters working on the problem," he said.

Based on the calculation that products manufactured from southern trees have a value at least seven times that of the value of the trees in the forest, sponsors of the Conference say that forest wildfires, set by man through carelessness or cussedness, cost the South's economy at least $250,000,000 a year. Growing trees and manufacturing products from them is estimated to be a $5,000,000,000 annual business.

In 1954 there were more than 250,000 fires in the 16 states joining in the Conference. More than 8,363,000 acres were burned, and the loss in terms of the value of the timber alone amounted to more than $35,000,000.

"Since the bitter statistics show that 85 out of every 100 wildfires in the nation's forests are in the South, many feel that this region-wide effort is long overdue," say the sponsors of the Conference. "Particularly since 89 out of every 100 acres lost to fire are in the South, and 94 out of every 100 fires that are deliberately set are in the South."

The eleven sponsoring organizations of the Southern Forest Fire Prevention Conference are the American Forestry Association, American Turpentine Farmers Association Cooperative, Association of State Foresters, Council of Forestry Association Executives, Forest Farmers Association Cooperative, Louisiana Forestry Association, Southern Hardwood Producers, Inc., Southern Pine Association, Southern Pressure Treaters Association, Southern Pulpwood Conservation Association and the Southern Region, U. S. Forest Service.

The 16 states to be represented are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

"In two days of meetings in New Orleans the Conference will review the growth of the wood-using industries, their importance to the South and the rate at which the region's future prosperity is being literally burned up," said Besley.

"The Conference will discuss what has been done to date in preventing wildfires and then concentrate on programs and methods to arouse South-wide public opinion and action against both the carelessness and deliberate arson which send wildfires raging through the forests.

"Delegates will study existing education and public opinion tools which can be used on a South-wide basis. They will learn how local programs that are successful are oparated, and

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how to apply them in other localities. Laws against woods burning will be reviewed and the methods for catching and punishing those who set the woods on fire will be explained."

P. F. Watzek Named Director of Resources for the Future

Election of P. F. Watzek of Crossett, Ark., to the board of directors of Resources for the Future, Inc., was announced January 31 by Horace M. Albright, chairman of the board.

Mr. Watzek is president of The Crossett Lumber Company and has been associated with the forestry program and manufacturing activities of his company since 1938. He is an associate member of the S.A.F. and a past director of the National Association of Manufacturers.

Resources for the Future, Inc. Studies Forest Credit, Insurance

Resources for the Future, Inc. has begun a study of credit and insurance for private forest lands. The purpose of the study is to examine the degree to which present credit and insurance needs are adequately met, and the degree to which additional private or public credit facilities may be needed. "The findings of the recent Timber Resource Review," says Marion Clawson, director of Land Use and Management for Resources for the Future, "with its emphasis upon the great importance of the small forest landowner in the total forestry picture, has lent added importance to the problems of credit and insurance, especially for the small owner." The study is expected to provide the facts as to the present situation of forest credit and insurance, and some suggestions for improvements, if any seem necessary. The study is expected to take a year or more.

To assist in this study, Resources for the Future has invited a number of forestry specialists and economists to serve as an advisory committee. The committee has met twice; in early December, 1955, and February 16 and 17, 1956. The members of the committee are:

Murray R. Benedict, professor of agricultural economics, College of Agriculture, University of California, Berkeley, Calif.; John D. Black, professor of economics, graduate school of public administration, Harvard University, Cambridge, Mass.; Marshall N. Dana, U. S. National Bank, Portland, Ore.; Samuel T. Dana, dean emeritus, School of Natural Resources, University of Michigan, Ann Arbor, Mich.; Russell C. Engberg, chief of Re-

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Progress Reported in Blister Rust Control

The blister rust disease which attacks white pines has been checked on 17 million acres of the 23.3 million acres needing control, the U. S. Department of Agriculture recently announced.

Reports from field offices of the Forest Service show that 1.4 million acres received treatment during 1955, with wild currant and gooseberry, intermediary hosts of the disease destroyed. State and local agencies contributed $712,000 to the 1955 control program, an increase of $62,000 over 1954 contributions.

White pine blister rust is found in the Northeast, the Lake States, the northern Rocky Mountain States, and the states along the Pacific Coast.

In the northern Rocky Mountain area, the battle is still in a "touch and go" status. Although the disease has been checked on many areas throughout the country, periodic examination of white pine areas are needed in order to maintain control.

Out of an estimated total annual loss of 20 billion board feet of saw timber, attributed by the Forest Service to diseases, 623 million were lost to the blister rust disease.

International Research Meeting

The twelfth Congress of the International Union of Forest Research Organizations will be held in England July 7-15, 1956.

The meetings of the Congress, with the exception of the plenary sessions, will be held in the Imperial Forestry Institute at Oxford. Plenary sessions will take place in Regent's Park College, Oxford. There will be a number of excursions during the Congress.

Eight study tours are being offered

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LEADERS in the Forest Pathology Teaching Conference at Atlanta, Georgia, *left* to *right:* Dr. T. W. Johnson, Duke University; Dr. R. P. True, University of West Virginia; Dr. D. V. Baxter, University of Michigan, and Dr. Arthur Kelman, North Carolina State College.

to delegates, each of about one weeks duration, following the Congress. These tours will, between all of them, cover England, Scotland, and Wales and will enable delegates to see research progress and problems in both British Forestry Commission and privately owned woodlands.

Timber Farmers Vote to Merge

The Independent Timber Farmers of America voted at their annual meeting in November held at Superior, Wis., to merge with the existing farm organizations. It was felt that such groups as the Farmers Union, Farm Bureau, and the National Grange would be in a stronger position to promote the active interests of small timber producers and owners than continuing a separate organization.

The resolution passed by the membership urged all members to affiliate with one of the larger farm groups so as to make the benefits of farm legislation available for timberland owners. A committee headed by Donald Lehtinen of Superior, Wis., and Mrs. Beatrice Pies of Spooner, Wis., will continue to work with the membership until the merger is completed.

The Independent Timber Farmers voted to plant a memorial grove of Norway pine in honor of its secretary-treasurer, John L. Sprague, who passed away after a long illness. Charles H. Stoddard who served as I.T.F.A.'s executive director during three years resigned his post in the fall to accept a position as forest economist with Resources For the Future in Washington, D. C.

Conference on Teaching of Forest Pathology at AAAS Meeting In Atlanta

A conference on the teaching of forest pathology at the undergraduate, masters, and decorate level was held at Atlanta, Georgia, on December 30, 1955, under sponsorship of the American Phytopathological Society of the American Society for the Advancement of Science. The conference, organized by Dr. Arthur Kelman of North Carolina State College and Dr. T. W. Johnson of Duke University, was attended by 30 representatives of universities, the Forest Service, state forestry organizations and other groups. Dr. R. P. True served as chairman of the conference, assisted by Dr. Dow V. Baxter of the University of Michigan. Problems connected with the teaching of forest pathology at various college levels, particularly proper emphasis in the undergraduate curriculum, were thoroughly discussed.

Industrial & Private

Timber Engineering Co. Expands Research, Advances Personnel

Carl A. Rishell, since 1943 director of research for the National Lumber Manufacturers Association and of its affiliate, the Timber Engineering Company, has been named vice president of the latter. In his new capacity he will direct particle board development services and facilities for "Teco." The research organization is presently undergoing a $200,000 expansion program that will include a pilot plant for particle board studies.

Succeeding Rishell as "Teco" director of research is Nicholas B. Poletika, while Robert R. Blumenstein has been advanced to assistant director from the position he has held since 1952 as manager of the research laboratory. Blumenstein is associate editor of the JOURNAL OF FORESTRY for forest and wood utilization.

New Officers for Southern Pulpwood Conservation Association

N. W. Sentell of Robert Gair Com-

pany, Inc., Hodge, La. was elected president of the Southern Pulpwood Conservation Association at the annual meeting in Atlanta on January 18. He succeeded K. S. Trowbridge of the North Carolina Pulp Company.

R. C. Barienbrock of Chillicothe, Ohio was elected vice president. Henry J. Malsberger continues as manager and forester.

P. S. Greenwood to Alaska Industrial Post

The Columbia Lumber Company of Alaska has announced the appointment of Peter S. Greenwood to the position of manager, Timber Division, with headquarters in Juneau. The appointment was effective Feb. 1.

Greenwood is a graduate of the University of Washington College of Forestry and has been connected with the West Tacoma Newsprint Co. during the past nine years. He was previously employed by the U. S. Plywood Corp. and the Corps of Engineers in southeastern Alaska.

Southern Bell Sponsors N. C. 4-H Forestry Program

Southern Bell Telephone and Telegraph Company cooperating with the N. C. Agricultural Extension Service again in 1956 will sponsor a Forestry Awards and Camp Program for North Carolina 4-H Club boys.

Purpose of this program is to encourage full participation in 4-H forestry training and project activities. It will cover three major phases—forestry project achievement, forestry demonstrations, and forestry leadership training.

Achievements will be rewarded through silver medals of honor to county winners, and, for the state winner, an all-expense trip to the 1956 National 4-H Club Congress.

The inauguration of this program in 1955 resulted in Club members completing 20% more projects in tree planting, timber stand improvement, forest protection, and tree identification than in the previous year.

Forestry Suppliers Positions Announced

James W. Craig, state forester of Mississippi left that position January 1 to return to the company founded by him, Forestry Suppliers, Inc., Jackson, Miss. Craig will manage the consulting division of the firm.

Ben C. Meadows, president of Forestry Suppliers, has announced the election of Robert E. Drexler as vice president and Purvis R. Huff as secretary of the firm.

Dexler is a forestry graduate of Iowa State College. Before joining the firm in 1952 he had served as management forester for the Southwest District of the Mississippi Forestry Commission and had previously been with the U. S. Forest Service and the Iowa Conservation Commission.

Huff has been employed with Forestry Suppliers as forester in the consulting division since his graduation in 1952 from Louisiana State University.

Lumberman Establishes Scholarship

A Nacogdoches lumberman has established two scholarships for forestry students at Stephen F. Austin State College.

Arne K. Kemp, head of the S.F.A. forestry department, anounced that the awards are being made by Lacy H. Hunt, president of a Nacogdoches lumber company. The scholarships provide $150 for each of the two recipients, he explained.

The scholarships will be used to aid qualified forest management students interested in forestry as a career. Recipients will be selected by a committee composed of members of the S.F.A. forestry department faculty and Mr. Hunt. The awards this year will be made during the spring semester.

Western Pine Names New Idaho-Montana District Forester

A former Arizona industrial forester, Arthur Lynn, has been named district forest engineer of the Western Pine Association for Montana and Idaho. He succeeds Hanley Morse, formerly of Coeur d'Alene, who recently became resident manager of the Diamond Match Company's lumber manufacturing plant at Superior, Mont.

Lynn's appointment was announced by E. L. Kolbe, association chief forester.

A 1951 graduate of Iowa State College's forestry school, Lynn was with Southwest Lumber Mills, Inc., McNary, Ariz., for four years and in recent months has been engaged in land and mineral surveying.

On his new job he will be concerned with extension of the Western Pine tree farm program among private landowners, together with advising owners and industry members of the association on forestry programs and problems.

In World War II Lynn was four years with the infantry, with two years in Europe spanning five campaigns.

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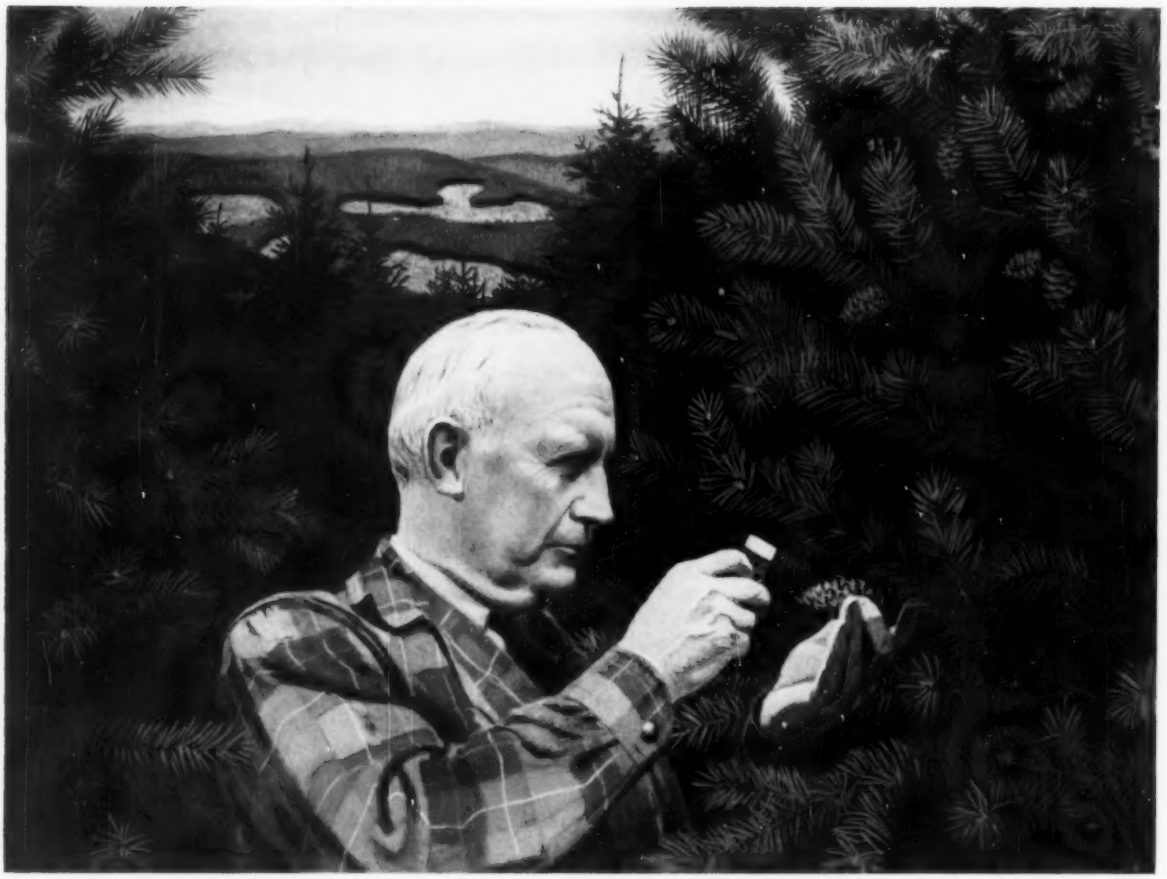

LEO A. ISAAC, research forester for U. S. Forest Service and world's leading authority on Douglas fir silviculture. The information developed through his 30 years of research at Pacific Northwest Forest and Range Experiment station has been reported in more than 50 publications and now serves as a basic guide for the management of Douglas fir.

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Forestry research has resulted in growing assurance that tree farms can always produce wood for use in lumber, paper, rayon, chemicals, and about 4,000 other products.

To supply America's increasing demand for wood, the nation's forestlands must be kept productive by growing timber in repeated crops. Toward this end, forest scientists in industry and government are working together to acquire a more accurate knowledge of tree life through research. Typical of the men in this field is Leo A. Isaac, research forester and world-recognized authority on Douglas fir. His studies in seed distribution, natural reforestation and harvesting methods have helped establish basic forest management practices used in the Douglas fir region.

Today, forestry research programs are concerned with improving both the quality and quantity of future timber crops. The effect of seed selection, forest soil, pruning and thinning upon tree growth is under concentrated study. As a result of these experiments, America's 7,000 private owners of industrial tree farms will be able to grow *more* wood per acre for the forest products of tomorrow.

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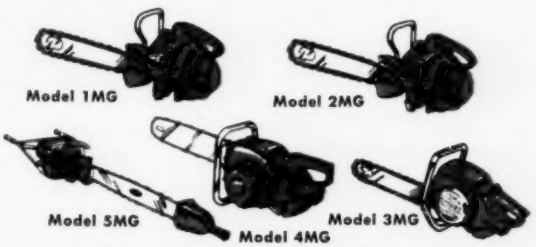

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New Location of A.P.A. Northeast Office

The American Pulpwood Association has announced that the office of their Northeast logging engineer has been moved from Gorham, N. H. The new address is 533 Forest Ave., Portland, Maine. James S. Hensel is logging engineer.

Lumber Inspection Bureau Shortens Name

The West Coast Lumber Inspection Bureau is the new name of the half century old organization responsible for inspecting and grading of lumber produced in western Oregon, Washington, and northern California.

The new name became effective January 1, according to H. V. Simpson, manager, and replaces the more cumbersome West Coast Bureau of Lumber Grades and Inspection.

Headquarters for the Bureau is at Portland, with branch offices at Seattle, Eugene, Medford, Los Angeles, Washington, D. C., and New York. Resident supervisors are maintained year around at Eureka, San Francisco, Chicago, and Dallas, Texas.

Active direction of the Bureau is in the hands of General Superintendent Howard Brown.

Tree Farm Program Progress Reported

The American Tree Farm System gained 4,145,946 acres in 1955—a record spurt since the program was launched 15 years ago.

Certified Tree Farm acreage in 40 participating states totaled 37,838,910 on January 1 as compared to 33,692,964 acres a year ago, according to figures announced by C. A. Gillett, managing director of American Forests Products Industries, Inc., Washington, D. C., national sponsor of the program.

Georgia moved into national leadership during the past year, adding 1,105,539 acres for a January 1 total of 3,734,284 acres. Oregon is in second place with 3,426,792 acres; Texas, third, 3,370,099 acres; Alabama, fourth, 3,307,217 acres.

Mississippi leads in the number of Certified Tree Farms, 826. Texas is second with 779 and Alabama third with 578.

Four more states joined the program in 1955. They were Kentucky, Iowa, Illinois, and Utah. Wisconsin, which had restricted the program to industrial holdings, expanded it to include all classes of private ownership. Launchings for 1956 are planned in Vermont, Connecticut, Indiana, New York, Delaware, and possibly Oklahoma.

1956 Keep Washington Green Governor's Banquet Announced

The Kick-off Banquet for the 1956 forest fire prevention season in Washington has been announced in Seattle by M. P. Lazara, director. Friday evening, April 6th, was selected for the event. The Washington Athletic Club in Seattle has been reserved to handle the anticipated crowd. Officials and dignitaries from as far away as California and Washington, D. C. will attend. Governor Arthur B. Langlie, as governor of the first Keep Green State in the nation, will be principal speaker on behalf of the Keep Washington Green Association.

The Puget Sound Section of the Society of American Foresters, as co-sponsor of the celebration, has obtained Clint Davis, chief of the Division of Forest Fire Prevention of the United States Forest Service in Washington D. C. Each state governor, the president and executive secretary of each Keep Green program in the West have been sent personal invitations.

Ladies are invited and an unusual entertainment feature is planned. Inquiries should be sent to the Keep Washington Green office, University of Washington, Seattle 5, Washington.

Education

Minnesota School of Forestry Receives Foundation Grant

A recent grant from the Charles K. Blandin Foundation of Grand Rapids, Minnesota, has made possible a major expansion in the field of forest tree genetics at the University of Minnesota School of Forestry. Scott S. Pauley, associate professor of forestry and formerly with the Maria Moors Cabot Foundation For Botanical Research of

SCOTT S. PAULEY

Harvard University, is directing the new program. Through a cooperative agreement with the University of Minnesota's North Central School and Experiment Station, test sites and nursery facilities have been made available at Grand Rapids.

Initial attention is being directed to a study of genetic diversity in jack pine on a stand and individual tree basis. This study represents a logical extension of the jack pine seed source studies initiated by the School of Forestry in 1942 and the regional seed source studies undertaken in cooperation with the Lake States Forest Experiment Station.

The mode of inheritance and the degree of genetic control exerted over such characteristics as insect and disease resistance, stem form and branching habit, cone opening, growth rate, and wood quality are being given immediate attention. Silvical data accumulated from the study should prove of immediate usefulness to foresters concerned with the management of jack pine under natural reproduction systems. This study will also provide the necessary basic data required to establish seed orchards for the production of genetically high quality seed to be used for the planting of areas managed under a clearcut and plant system.

The native aspen, especially trembling aspen, will also receive major attention. The problem of "off-site" aspen will be studied to determine if such low quality aspen is the result of poor site alone, or the possible net

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result of the combination of a poor site and a genetically unadapted local strain or race of aspen.

Another aspect of this study will be an attempt to isolate genetically superior strains for use in a breeding project designed to develop improved lines for pulp production. This phase of the study will be carried on cooperatively with the Maria Moors Cabot Foundation For Botanical Research of Harvard University which has made available a number of F_1 hybrid progenies derived from intra- and interspecific aspen crosses involving selection of trembling and bigtooth aspen throughout the range of these species.

White and black spruce will also be studied, but intensive work on these species cannot be undertaken until more personnel and funds are available.

California Names Forestry Building in Honor of Late Dean

Regents of the University of California have named the School of Forestry building in honor of the late Walter Mulford, first dean of the School.

Completed in 1948, the four-story structure at the western end of the Berkeley campus was "to a considerable extent the direct result of Dean Mulford's own planning and work," according to Henry J. Vaux, present dean of the School.

"The building will thus serve as an appropriate and permanent symbol of the distinguished service he rendered to the University and to forestry education," said Vaux.

Dean Mulford died September 7, 1955, at the age of 78. He served the University from 1914 to 1947 and built the School from a handful of students to a leading institution of its kind in the world. (A report of the Dean's death and a brief summary of his career appeared in the November 1955 issue of the JOURNAL.)

Yale Holds Third Industrial Seminar

The Yale School of Forestry held its second Industrial Forestry Seminar of the current academic year, and its third since the inauguration of such seminars, January 23—February 3.

The seminar was directed by T. F. Wohlenberg, professor of industrial forestry at Yale. Lecturers for the series included Yale faculty members as well as authorities from business, industry, and government. In addition to lectures, the 14 forest industry executives in attendance participated in general discussions and the exchange of information.

Yale's first Industrial Forestry Seminar was held in April, 1955, and met with enthusiastic response as have the subsequent ones.

California Students Selected For Johnson Award

Five students have been selected to receive the S. S. Johnson Award, it has been announced by the University of California School of Forestry.

The $100 award, to encourage students to prepare for careers in private forest industry, was established 10 years ago by the late S. S. Johnson, a prominent California lumberman, and the California Forest Protective Association. It is given to junior students on the basis of forest work they do during the summer preceding their senior year.

The five are: Peter A. Crebbin, David S. Dealey, Henry H. Haight, IV, Eldon R. Knauf, Jr., and John Razzeto.

Of these five, one will be selected this spring for an additional $150 award according to Dean Henry J. Vaux of the School of Forestry.

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Paul Casamajor on Teaching Appointment

Paul Casamajor, formerly with the Shasta Forest Company, Redding, Calif., and more recently representing a California firm in Washington, D. C., will teach a course in forest fire protection at the University of California School of Forestry during the spring semester of 1956. Casamajor will also conduct research in fire control with the California Forest and Range Experiment Station.

R. B. Miller Honored

R. B. Miller of Sidney, Nova Scotia, M. F. Yale 1908, formerly head of the Department of Forestry at the University of New Brunswick, chief forester of Illinois, and professor of forestry at Michigan College of Mining and Technology, now retired, was recently honored by the Canadian Institute of Forestry.

At the C.I.F.'s 1955 annual meeting, Dr. Miller was made an Honorary Member in recognition of his "outstanding contribution to forestry in Canada and the North American continent as a whole."

Public

Fires on National Forests Drop 20 Percent During 1955

Forest Service field offices reported 8,160 forest fires on federal and other lands within the national forest boundaries during 1955, the U. S. Department of Agriculture has announced. This represents a drop of more than 20 percent from the 10,462 reported during 1954.

Man-caused fires dropped correspondingly from 5,978 in 1954 to 4,375 in 1955. The area burned, however, increased from 142,253 acres in 1954 to 365,905 acres in 1955.

Largest area burned was in the California region where 183,525 acres were swept by fire. In 1954 this region reported 46,753 acres burned. The southern region, made up of 11 states (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma and Texas) reported 116,931 acres burned in 1955 as compared to 53,255 acres in 1954.

Generally, the increase in acreage burned was caused by prolonged hot dry spells which created extreme forest fire hazards.

California Assistant Extension Forester Named

Edward E. Gilden has been named as assistant to Woodbridge Metcalf, California extension forester. He succeeds Rudy Grah who resigned last fall to take a position with the University of California School of Forestry.

Gilden is a graduate of Washington State College and had been working, prior to this appointment, with the Extension Service in Douglas County, Oregon.

C. T. Brown to Tongass National Forest

Carlos T. Brown was transferred Feb. 1 from the Denver office of the U. S. Forest Service to become division supervisor of the Tongass National Forest in Alaska. Since 1953 Brown had held the position of assistant division chief of the Division of Operation and Personnel Management in the Rocky Mountain Region. He is a 1933 Oregon State College forestry graduate and has served since that time on a number of western national forests. In Ketchikan he will direct administration of the southern division of the forest embracing several million acres

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of national forest land. A new $55,000,000 pulp mill was erected there in 1954.

James L. Wenban, Juneau, Alaska, office of the Forest Service has replaced Brown in Denver according to Regional Forester Donald E. Clark.

Northwest Station Editor Appointed

Transfer of E. F. Peffer, assistant district forest ranger on the Leavenworth District of the Wenatchee National Forest, to the position of publications editor, Pacific Northwest Forest and Range Experiment Station in Portland, has been announced by Robert W. Cowlin, director. Peffer had been on the Wenatchee Forest since May 1954.

Peffer is trained both in forestry and in journalism, having received his forestry degree from the State University of New York and a Journalism degree from Montana State University. He served as information specialist in the regional forester's office in the Information and Education Division from 1951 to 1954. In his new assignment, he will work with personnel of the Experiment Station on the publication of research project results.

Arnold Hanson Transferred to Region 1 Office

The transfer of E. Arnold Hanson from the Washington office of the U. S. Forest Service Region 1, Missoula, Mont., was announced by Regional Forester P. D. Hanson in January. Hanson will serve in the Division of Information and Education as assistant chief. Hanson succeeds Robert A. Lerchen who recently transferred to the Office of Budget and Finance, Department of Agriculture, Washington, D. C. Mr. Hanson will work with Assistant Regional Forester James K. Vessey who is in charge of the Division.

For the past five years Hanson has been serving in the Washington office of the Division of Information & Education. His experience with the Forest Service dates from 1936 when he served first as a seasonal employee. He worked with the Lake States Forest Experiment Station and in different positions on national forests in the Intermountain Region and the regional office in Ogden, Utah. He was district ranger of the Carson Ranger District, Toiyable National Forest, Carson City, Nev. at the time of his transfer in 1950 to the Washington office.

Hanson attended the North Dakota School of Forestry and in 1937 received a Bachelor of Science degree in forestry from the University of Minnesota. In 1939 he received his Master of Forestry degree from Harvard University. He attended Montana State University's School of Public Administration in 1950.

Hanson is a member of the Society of American Foresters and has served as chairman of the Washington, D. C. Section. He participated in the planning of the 1954 Boy Scout Conservation Good Turn project and assisted in the conduct of the Conservation Tour of last June for the 12 National Boy Scout Conservation Award winners.

National Forest Flood Damage Assessed

Preliminary estimates of damage to improvements on the national forests of the Pacific Northwest Region reveal that flood damage from November and December 1955 storms was the second highest on records of the U. S. Forest Service, according to R. F. Grefe, Northwest Region engineer. Highest all-time damage occurred during the late spring and early summer of 1948 when winter snows were quickly melted by sudden warm weather with heavy rains, causing losses of from three to four million dollars.

Cost of replacing and rebuilding improvements damaged or lost from the 1955 storms has been set at $1,108,000. Since this figure is on the basis of early estimates, the actual rehabilitation may run considerably higher.

The racing flood waters wreaked most havoc on roads, bridges, and culverts, but took its toll of other improvements also. Forest camp and picnic area repair will cost an estimated $42,000 or more.

Overall damage was greatest on Siskiyou National Forest in southwestern Oregon, followed closely by that on Mt. Hood National Forest in northern Oregon. Of Washington national forests greatest losers were the Snoqualmie, Okanogan, and Olympic. Nearly every national forest suffered damage.

G. C. Baker Transferred to Portland Region Office

Gail C. Baker has been promoted to the position of assistant to the division chief of the Pacific Northwest Region U. S. Forest Service, Division of Information and Education. Prior to his

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Positions Available

Forester and Timber Buyer for established band mill operation. Expanding management department offers opportunity for advancement commensurate with ability. Write giving age, experience and salary expected.
Roy O. Martin Lumber Company, Inc., Box 1110, Alexandria, La.

The Bureau of Land Management is recruiting Foresters and Forest Engineers at Grade GS-5 ($3670 per annum) and Grade GS-7 ($4525 per annum). These positions are field positions located in District Forestry Offices in western Oregon. Persons interested should file an Application for Federal Employment, Form 57, with the State Supervisor, Bureau of Land Management, P. O. Box 3861, Portland 8, Oregon.

Positions Wanted

Forester, B. S. F., Univ. of Massachusetts, married, one child. Currently serving as a radar technician in the U. S. Army. Previous experience limited to summer jobs with the Forestry Service. Interested in aerial photogrammetry. Available August 1.
Box H, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S. 1951, Univ. of Maine, Age 27. Married. Now in military service, available about May 1. Experience: Four years state forester, timber-stand improvement, cruising, marking, scaling, logging camp supervisor; 20 months entomologist U. S. Army. Desire location in Northeast with organization offering opportunity for personal initiative and advancement.
Box J, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, 25, B. S. 1952, N. Y. State, single, presently officer in Corps of Engineers with release in April. Interested in overseas work, public or private. Experienced in foreign travel and willing to go anywhere if work is interesting and opportunities good.
Box K, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester; B.S., Univ. Maine 1950; married, two children. 4 years experience southern pulp industry in timber acquisition and forest management. Presently employed by southern lumber manufacturer, 1½ years experience in timber acquisition, forest management, and supervision of contract loggers. Active commercial pilot 2000 hours; other aeronautical ratings. Desires position in West or Northwest as forester or pilot-forester.
Box L, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S.F. 1952, married, 3 children, veteran, age 28. Currently employed by tree surgery company; trained in management, sales, supervision. Desires position either in same field with greater advancement opportunity or in related field such as city forestry, park planning and development or forest management. Prefer East.
Box M, Journal of Forestry, Mills Building, Washington 6, D. C.

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new position, he was a staff officer on the Deschutes National Forest at Bend, Oregon.

Baker graduated from Oregon State College in 1933 with the B.S. degree in forestry. He replaced Virgil R. Carrell who was transferred to the Denver regional headquarters.

Robert Reinhardt Joins Washington Forest Service Staff

Robert Reinhardt, of the 6th Army Headquarters, Presidio, San Francisco, Calif., has joined the timber management staff of the Forest Service in the U. S. Department of Agriculture in Washington, D. C. He will work on the development of improved methods of scaling, cruising, and timber sale administration.

During his past five years with the army in San Francisco Mr. Reinhardt has been working on land use management. Previously he was stationed at Fort Lewis in Washington where he worked on timber sales and land utilization. Between 1936 and 1947 he was employed by the Forest Service in the Pacific Northwest as assistant ranger and assistant in fire control for the region.

A native of Colorado, Mr. Reinhardt received his degree in forestry from Colorado A&M College in Fort Collins.

Will there be a vaccine against cancer?

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The other day scientists vaccinated a horse with dead cancer cells from 56 human cancer patients. The horse developed antibodies against cancer. These antibodies then killed live human cancer cells in a test tube.

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American Cancer Society

L. L. Bernhard Transferred to California Region Office

Lloyd L. Bernhard was recently promoted to act as assistant to the chief of the Division of Range Management in the California Region at San Francisco.

Prior to his present position he was a staff officer on the Malheur National Forest at John Day, Ore.

Bernhard graduated from the University of Montana in 1937 with the B.S. degree in forestry.

T. G. Storey Transferred to Asheville

Theodore G. Storey, of the U. S. Forest Service, has been transferred to Asheville, N. C., from the California Forest Experiment Station in Berkeley. He will be a staff member of the Southeastern Forest Experiment Station working with Ralph M. Nelson, George M. Byram, and John J. Keetch in the Division of Forest Fire Research.

Mr. Storey has been with the Forest Service for 7 years. He is a graduate of the University of California. During the war he served with the Navy's Sea Bees as enlisted man and Ensign. Working on special projects, he has spent some time in Nevada and the Pacific islands on atomic research.

C. S. Schopmeyer Wins Award

Clifford S. Schopmeyer, research forester of the Lake City (Fla.) Research Center has been given a $300 cash award by the U. S. Forest Service for outstanding work. According to a recent announcement by E. L. Demmon, director of the Southeastern Forest Experiment Station, Schopmeyer's record shows a sustained output of basic research in naval stores involving a high degree of originality and technical competence. Dr. Schopmeyer has been a member of the Lake City staff for more than 10 years.

Two Pennsylvania Foresters Retire

The Pennsylvania Department of Forests and Waters has announced the retirement last December of Charles C. Hogeland and T. Roy Morton. At the time of their retirement Mr. Hogeland was chief of management in the Harrisburg office of the Department, Mr. Morton was field representative of the Department at Huntington. Both men are graduates of the Mont Alto State Forest Academy. Morton joined the Department in 1905, Hogeland in 1916, thus together representing a total of some 90 years of service to forestry in their state.

This D8 with No. 8S Bulldozer is building a firebreak in the Santa Barbara area near the Cachuma Dam, Calif.

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